CHAPTER VII
DETERMINANTS OF FOREIGN DIRECT INVESTMENT IN INDIA

7.1 Introduction:

The empirical estimation of determinants of FDI flows is conducted in this chapter at two different levels: across states and country level. A combination of quantitative and qualitative characteristics, such as market size, quality of human capital, technical manpower, infrastructure, industrial development, good governance, Research and Development intensity have been identified as major determinants of FDI in India. Private corporate investment is potentially highly mobile across states and therefore likely to flow to states which have a skilled labour force with a good work culture, good infrastructure especially power, transport and communications and good governance generally (Ahluwalia, 2000).

The next section of the chapter deals with FDI determinants across states. In third and fourth section FDI Potential Index and Inward FDI Performance Index is constructed. In the fifth section, regression analysis for determinants of FDI across is carried out. The sixth and seventh section analyses the determinants of FDI at All-India level. The eighth section analyses the determinants of manufacturing sector FDI and export oriented FDI during post liberalization. The last section ends with important observations and conclusion.

7.2 Determinants of FDI at State level:

There are very few studies on the determinants of FDI across Indian states. A few surveys and studies carried out in India is presented below:

NCAER (2000) undertook a study to find out the policy competitiveness of Indian states in attracting direct investment and the effects of this competition on economic development. The study found infrastructure as the most critical variable influencing the investors decisions as compared to incentives offered by the state governments.

FICCI (2001) studied the actual performance of various Indian States in terms of attracting FDI and also the investor perception about the states. It found that the ranking according to investor perceptions is different from ranking in terms of FDI approved. Significantly, Maharashtra, which in any case is the No.1 State in terms of FDI approvals,
also ranked No. 1 on investor perception. The other states were Karnataka, Delhi, Andhra Pradesh, Tamil Nadu and Gujarat in order. According to FICCI (2004), market size, highly skilled manpower, low cost of infrastructure and operation were the top three motivating factors for foreign investors entry into India. Political stability in policy guidelines, reduction in ground level obstacles, rate of return, healthy market growth, manpower availability and skills, stable exchange rate and government incentives are the factors critical for determining future FDI inflows.

A joint study by World Bank- CII (January 2002), evaluated key Indian States on their investment climate, based on a “Firm level Analysis of Competitiveness”. The study covered 1099 companies and 10 key states of India. The study found that Labour - value added per worker, Regulatory hassles, Customs delay, Cost of power and interest costs were the factors which impact investment climate. The study found that Maharashtra had the best investment climate.

Business Today - Gallup Survey (2003) ranks the states taking into account factors like quality of infrastructure, labour and Banking & Credit. Maharashtra has always topped the list of States conducive to Business. Maharashtra has a clear edge on all infrastructural metrics like efficient Ports, good road connectivity and probably the best power situation. Other factors like proximity to markets, the biggest financial centre and people who are both industrious and enterprising have been identified as factors that make Maharashtra the hottest state for investment.

The World Bank-CII (2003) in another survey indicates significant inter-state variations in the investment climate, and also on how investors perceive the investment climate across states. In the 2003 Survey, six states that attracted almost all the FDI were rated to have a better investment climate by the majority of respondents (Maharashtra, Delhi, Gujarat, Andhra Pradesh, Karnataka, Punjab, Tamil Nadu and Haryana). The first three states are also the only ones to have registered growth in per capita incomes greater than 6.5%. Differences in the quality, availability and cost of infrastructure are critical in explaining the differences in investor perception of the investment climate across states. According to the survey, these ‘better climate’ states are found to have better physical infrastructure and particularly, power supply.

The IMF (2004) study found that FDI has been concentrated in a few Indian States of Andhra Pradesh, Delhi, Karnataka, Maharashtra and Tamil Nadu. and even among
these states, there is considerable heterogeneity. Further, the study found that labour market flexibility and infrastructure are the key factors in FDI location. The study points out that State-specific policies and incentives to attract FDI are not a substitute for improving the overall business climate, the IMF study said this is borne out by the experience of States such as Haryana, Himachal Pradesh and West Bengal, which offer incentives but attract little FDI.

More developed states are expected to receive greater amounts of FDI inflows than less developed states. Foreign firms have more confidence to invest in states where employees have higher levels of human capital and general infrastructure, communication networks and other utilities are more developed. The following factors are identified as main determinants of FDI among states:

1) Economic Determinants, which includes Market Size (PCNSDP), Growth of Market size (growth of PCNSDP)
2) Infrastructure (Roads, Railways, Power, Vehicles, Post offices, Bank branches).
3) Quality of Human Capital (Graduates and above per lakh population)
4) Levels of Human Development. (Human Development Index)
5) Good Governance (Fiscal Imbalances and Development Expenditures)
6) Industrial Development
7) Development of Science and Technology, which includes Expenditure on Research and development, Research and Development Institutions, Internet subscribers, engineering students per lakh population.
8) Openness (Presence of Export Oriented Units (EOU’s)).

I. Economic Determinants

**Market size and growth prospects.** Factors like market size (Per capita NSDP) prospects for market growth (growth of PCNSDP and NSDP), of states are important factors determining FDI flows. Empirically, Market size has been positively related to the level of FDI (Buckley and Casson 1981; Dunning, 1993), and has traditionally been tested as an important element of FDI location. The larger the hosts market the more appealing for would-be foreign investors due to a greater demand. States with larger market size, faster economic growth and a higher degree of economic development will provide better
opportunities for enterprises to exploit their ownership advantages and creates possibilities for economies of scale. FDI attracted by these advantages is called ‘market-oriented’. Size of markets and sustained growth of markets are an obvious attraction to profit maximizing firms. The correlation co-efficient between Per capita FDI approvals and PCNSDP (at current prices) of states is found to be 0.701, which is significant at 1 percent level. This high correlation indicates that market size and FDI flows move together. Delhi, Maharashtra and Gujarat are the three high PCNSDP states to attract FDI. However, a closer observation of Table 7.1 reveals that Punjab and Haryana, which are high income states have failed in matter of FDI. On the other hand, Karnataka and Andhra Pradesh, which are medium income states have managed to attract FDI. A closer observation Column (3) reveals that although Punjab and Haryana rank high in

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Source: Growth of NSDP and PCNSDP Calculated from Appendix Table.7.1 and 7.2
The data on poverty is collected from National Human Development Report, 2001

| High income and high growth | Maharashtra, Gujarat, Tamil Nadu and Karnataka, Andhra Pradesh, Kerala, Goa |
| High income and low growth | Punjab and Haryana |
| Low income and high growth | West Bengal, Rajasthan |
| Low income and low growth  | Madhya Pradesh, Assam, Orissa, Uttar Pradesh and Bihar |
PCNSDP, these are the states which have experienced lower growth of PCNSDP than the high investment climate states like Tamil Nadu, Karnataka, Andhra Pradesh during post liberalization period. Thus the relatively high-growth states are not necessarily the wealthiest states. An average per capita PCNSDP (1991 to 2003) of Rs 17,617 for Punjab and Rs.16,197 for Haryana indicates that these states are slightly richer than the high investment climate states. However, good-climate states have been growing faster over the past decade (Tamil Nadu 14 percent, Karnataka 12.86 and Andhra Pradesh 12.86). The correlation co-efficient between Per capita FDI approvals growth rates and PCNSDP growth rates during 1991 to 2003 is found to be 0.459, which is significant at 5 percent level. The variation in economic performance is large. The per capita NSDP varies from the poorest state, Bihar, at Rs 4,071 at current prices, to the richest states Delhi, 29406, Goa Rs. 27929, Maharashtra, at Rs 16,824. Growth performance has been equally varied, with the slowest growth in state per capita income in Bihar, at 6.6 per cent per annum compared with the fastest growth in small state like Goa, at 16.77 per cent per annum during the study period. Conversely, poverty on the other hand reduces the purchasing power and hinders FDI flows as is evident in the negative correlation coefficient of -0.280 between Per capita FDI approvals and poverty. Poor states like Bihar, Assam, Uttar Pradesh, and West Bengal have remained poor FDI attractive states due to widespread poverty. Orissa, though a poor state, has managed to attract FDI mainly because of its resources. But the growth rate of FDI approvals has turned out negative for Orissa during the study period.

2. INFRASTRUCTURE:

Infrastructure is the foundation of economic, industrial and social development. The multiplier effect of infrastructure development on the economy is significant and it's role as a stimulator of economic growth is indisputable. The availability and reliability of infrastructure is a major determinant of business profitability. (World Bank and IFC, 2004). Availability of adequate infrastructure facilities is an important pre-condition for sustainable economic development. Availability of good quality physical infrastructure could also improve the investment climate for FDI by subsidizing the cost of total investment by foreign investors and thus raising the rate of return (Kumar Nagesh, 2002). Poor infrastructure is a reflection of the poor investment climate. Many studies throw light on the role of good infrastructure in influencing FDI inflows (Wheeler and Modi, 1992, Bende-Nabende et al., 2000) Infrastructure covers many dimensions, ranging from roads, ports, railways and telecommunication systems to institutional development (banks).
Dunning (1993) argued that low transport and communication costs are a locational factor explaining FDI in a host economy. Krugman's (1991) model of geographic concentration of production activities highlighted the importance of the transportation network to get wider market access to the firms in a manufacturing belt. If there is no proper infrastructure, investors have to build their own in order to produce, transport, sell or export their products. A high correlation of 0.922 between per capita FDI approvals and Infrastructure Index, which is significant at 1 percent levels across Indian states, indicates the significance of infrastructure in locating foreign investment across states.

A composite Index of Infrastructure is developed using the Principal Component Analysis as mentioned in the methodology of First Chapter. The various infrastructure variables and their significance are as follows:

Transport Infrastructure is captured through 3 variables:

1) Road Length per 1000 square kilometer of area.

2) Railway Length per 1000 square kilometer of area.

3) Registered Motor Vehicles per lakh population.

Railways and Roadways are an important indicator of transport development in a state. State-wise vehicle density per lakh population is an indicator of the level of development of road transport across states. Vehicle density indicates overall quality of transport service in state. Power is the backbone of economic development. Per capita consumption of power captures the energy availability in a state and is highly positively correlated with the standard of living as captured through PCNSDP, (0.837, significant at 1 percent level). This is a proxy for the availability and cost of energy, which is an important input for many production activities and can be expected to be a factor influencing FDI, particularly of an efficiency-seeking type (WIR, 2002). Financial Infrastructure is proxied through the number of banks available per lakh population. Communication and Telecommunications is captured with the help of post offices per lakh population and Telephones per 100 persons. Telecommunication lines are a universally used indicator of the level of development of communications. According to IMF study, states with higher teledensity attract more FDI in India. According to (FICCI Survey 2004), among the infrastructure facilities available, it is only the country's telecom network – its reach and quality – that the foreign investors seem to be satisfied with. All the respondents have rated telecom facilities in India to be either 'average' or 'good'. Bandwidth availability has been rated as
‘average to good’ by 82 percent of the respondents. This also points to the constant upgradation of communication facilities being done in the country. High-quality and reliable power supply and telecommunications infrastructure reduce the cost of doing business and improve the state’s comparative advantage. Having constructed Infrastructure Index (Table 7.2), the ranks of different states vis-à-vis FDI performance can be explained. Delhi has the highest level of infrastructure development followed by Goa, Punjab and Kerala. Out of these 4 states, only Delhi has emerged as the attractive destination for FDI. Delhi, being the capital region, the high infrastructure index is quite obvious. Goa too has performed well in terms of growth of FDI during the study period, even though Goa doesn’t appear in High FDI performing states category. Goa is strategically located with good infrastructure facilities with a centrally located airport, a seaport, connectivity by excellent road network as also other essential infrastructure. But Punjab and Kerala have not been successful in maintaining the same rank in FDI as in infrastructure. Tamil Nadu, and Gujarat ranks fifth and sixth and are FDI attractive locations. Haryana, though has a good infrastructure, has not been able to capture the same place in case of FDI. Karnataka and Andhra Pradesh have medium level Infrastructure but ranks high as FDI attracting states. Assam and Bihar has the lowest

Table 7.2: State-wise Infrastructure Index

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<th>1992-93</th>
<th>1995-96</th>
<th>2001-02</th>
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<td>Andhra Pradesh</td>
<td>2.771</td>
<td>2.839</td>
<td>3.518</td>
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<tr>
<td>Assam</td>
<td>2.201</td>
<td>2.175</td>
<td>1.894</td>
</tr>
<tr>
<td>Bihar</td>
<td>1.997</td>
<td>1.974</td>
<td>2.117</td>
</tr>
<tr>
<td>Gujarat</td>
<td>4.871</td>
<td>5.037</td>
<td>5.243</td>
</tr>
<tr>
<td>Haryana</td>
<td>4.187</td>
<td>4.324</td>
<td>4.611</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>2.388</td>
<td>3.039</td>
<td>3.685</td>
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<tr>
<td>Jammu &amp; Kashmir</td>
<td>1.727</td>
<td>1.752</td>
<td>2.084</td>
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<tr>
<td>Karnataka</td>
<td>3.490</td>
<td>3.634</td>
<td>3.912</td>
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<tr>
<td>Kerala</td>
<td>4.964</td>
<td>5.356</td>
<td>5.882</td>
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<tr>
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<td>2.383</td>
<td>2.580</td>
<td>2.116</td>
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<td>Maharashtra</td>
<td>4.269</td>
<td>3.964</td>
<td>4.202</td>
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<td>Orissa</td>
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<td>2.788</td>
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<tr>
<td>Punjab</td>
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<td>8.258</td>
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Note: The data is given in Appendix Table 7.3 (1, 2, 3, 4 and 5)
Note: The Index is not comparable for different time periods because of different Eigan values.
infrastructure index value and the image of these states as least attractive states for FDI is obvious. Detailed data also shows that the key infrastructure sectors of power, roads, telecommunications, posts and banking are better developed in richer and middle income states as compared to poorer states (GOI, 2003). Investment generally flows to the states where infrastructure facilities are high.

3. Quality of Human Capital:

One of the more significant developments in the FDI literature has been the recognition that much of the activity of TNCs is now knowledge and efficiency seeking (Stethi, Guisinger, Phelan, & Berg, 2003). Host countries with more developed human resource capabilities should attract FDI that seeks higher skill levels or even technological and managerial capabilities. A well-educated work force is perceived as an important incentive for international investment location decisions. The quality of Human capital is proxied through the Students in Tertiary education as a percent of total population. This is a measure of the extent of higher education and related skills that a country’s workforce embodies. An educated and skilled workforce is an inducement for FDI in industries facing global and regional competition (WIR, 2002). Human capital is an essential part of a country’s enabling environment. In particular, a certain minimum level of education should be reached. Investment in general education and other generic human capital is of the utmost importance in creating an enabling environment for FDI. Achieving a certain minimum level of educational attainment is paramount to a country’s ability both to attract FDI and to maximise the human capital spillovers from foreign enterprise presence. The minimum level differs between industries and according to other characteristics of the host country’s enabling environment, (OCED, 2002).

4. Levels of Human Development:

Since 1990, the UNDP has been regularly bringing out annual Human Development Report, containing assessments of the levels of well being of the people of different countries. The same approach is used to prepare HDI for 17 states of India, which throws light on the developmental disparities in the social sectors at the regional level. The basic message of Human Development is that development is not only growth in income, wealth or consumption but the expansion of human capabilities. The three basic concerns are a long and healthy life, access to knowledge and skills and control over resources to ensure a decent standard of living (Karnataka HDR, 1999). With the help of HDI, states are ranked on the basis of their levels of Human development. Other than income levels; it
takes into account education and health, which are also crucial dimensions of development. The methodology followed for computing the HDI for states is that of UNDP as explained in the methodology of First Chapter. A positive correlation of 0.472 between Human Development Index (Table 7.3) and per capita FDI approvals is observed in the analysis. In case of Infrastructure, the rankings of individual states more or less matched their FDI performance. But in case of HDI, there is an exception. Kerala, which occupies the top most place in HDI, ranks lower, when it comes to attracting FDI. Similar is the case with Punjab.

5. Good Governance

An important factor which influences the speed of socio-economic progress of a state is the quality of governance. A better-administered state is more efficient in raising revenues and putting the revenues to better use for proper development. Such states are quick in grabbing the opportunities that come their way to attract more foreign investment. Even foreign investors have a great preference for better-managed states. Fiscally better off states are able to attract more foreign investment because of the already existing favourable investment climate in their respective states. The quality of governance is proxied through Fiscal Imbalances and Per Capita Development Expenditure(Table 7.4). A negative correlation between Gross Fiscal Deficit and per capita FDI suggests that a greater fiscal responsibility has to be exercised by the states. The correlation between

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Source: UGC Research Project: ‘Economic Reforms and Regional Disparities: Convergence or Divergence’ by Dr.R.V.Dadibhavi and S.T.Bagalkoti. Department of Economics, Karnataka University, Dharwad.(Data in Appendix table 7.3)
these two variables is -0.452. Interest Payment is another dimension of fiscal responsibility of the states. A negative correlation between FDI approvals and the size of interest payments (-0.479, significant at 5% Level), suggests that large interest payments by states is not conducive to FDI growth. Table 7.4 shows that it is not the poor performing states alone that have problems. Punjab has high ratio of interest payment. There are some states, which are in a relatively good position like Delhi, Goa, Tamil Nadu, Karnataka, Madhya Pradesh and Maharashtra. Similarly, Public

Table 7.4: Fiscal Imbalances of States during Post Liberalisation

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<tr>
<td>Kerala</td>
<td>5.06</td>
<td>19.76</td>
<td>1527.464</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>3.60</td>
<td>14.53</td>
<td>1140.412</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>3.57</td>
<td>14.88</td>
<td>1768.588</td>
</tr>
<tr>
<td>Orissa</td>
<td>7.80</td>
<td>25.52</td>
<td>462.721</td>
</tr>
<tr>
<td>Punjab</td>
<td>6.05</td>
<td>26.83</td>
<td>1820.348</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>5.75</td>
<td>21.63</td>
<td>1353.62</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>3.68</td>
<td>13.51</td>
<td>1622.117</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>6.15</td>
<td>24.60</td>
<td>814.4599</td>
</tr>
<tr>
<td>West Bengal</td>
<td>5.54</td>
<td>28.05</td>
<td>1017.834</td>
</tr>
<tr>
<td>Delhi</td>
<td>1.82</td>
<td>11.04</td>
<td>2772.501</td>
</tr>
<tr>
<td>Goa</td>
<td>5.34</td>
<td>13.27</td>
<td>6300.736</td>
</tr>
</tbody>
</table>

Note: The data with respect to the above is furnished in Appendix Table 7.4(1,2,3).

Development expenditure of state governments in socio-economic infrastructure (social services, economic services, energy, industry, transport and communication, science and technology) creates a stable and enabling environment that would crowd in FDI inflows. Many studies have shown that public investment facilitates private domestic investment, which in turn also pulls in FDI inflows.
Closely associated with quality of governance is the interest of state governments in Development of Science and Technology. Technological advances of the regions are of particular importance to foreign investors. Presence of Research and Development institutions and Expenditure on Research and Development indicates the technological capabilities of different states, including innovative capacity, which helps to attract created asset seeking FDI (WIR, 2002). According to OECD (2002), Research and Development is considered the most important source of new knowledge, technological progress and ultimately economic growth. Research and Development expenditure of an economy provides a measure of the international competitiveness of the local firms and thus attracts FDI (Kogut & Chang, 1991). Hence, the extent to which the business enterprise sector invests in research and development activities is likely to have a positive impact on the level of technological sophistication in the economy, which in turn is positively related to FDI inflows. There is also a positive and strong association between Research and development institutions and FDI flows. Existence of a few internationally renowned public funded centers of excellence like Indian Institute of Science (IISC), National Chemical Laboratory (NCL), and Indian Institute of Chemical Technology (IICT) have helped India to attract Research and Development investments from MNC’s (Kumar Nagesh, 2005). Some of the MNC’s involved in setting up Research and Development units are Astra Research Centre, Bangalore, 1986, (Sweden), Texas Instruments India, Bangalore, 1986 (U.S.A), Asia-Pacific Design Centre, India, 1992 (France), Unilever India Pvt. Ltd, Bangalore, 1996 (Netherlands), D-B Research Centre, Bangalore, 1996 (Germany). Some MNC’s setting up joint ventures with Indian companies includes Ranbaxy Labs, with Eli Lilly, U.S.A and Hindustan Aeronautics Limited, with British Aerospace, U.K.

Availability of engineers in a state attracts more FDI. In a Survey by FICCI (2004), an overwhelming majority of 79 percent respondents have said that availability of skilled manpower in India is ‘good’. 86 percent of the respondents have rated India as a highly attractive destination in terms of availability of skilled IT/BPO workforce. Workers in better climate or high-FDI states are more skilled or better equipped (Investment Climate Assessment 2004). The availability of skilled technical manpower and FDI flows is highly co-related. This Co-relation is 0.740, which is significant at 1 percent level. In line to this, Karnataka, Tamil Nadu, Maharashtra and Delhi have managed to attract more FDI
approvals due to high turn out of engineers. Karnataka has a rich pool of talented, qualified and affordable human resource that is rejuvenated every year through its excellent educational infrastructure. It offers quality Research and Development facilities with world-renowned institutions doing innovative work at the cutting edge of technology (Ministry of External Affairs, GOI 2002. Further; Karnataka has the highest percentage of employees in Engineering Industries (40 percent out of total), whereas, in Maharashtra, Tamil Nadu and Gujarat, the percentage of employees in Engineering Industries is 34, 24 and 22 percent out of total employees in industries respectively. The percentage share of value of output from Engineering Industry is also high in Karnataka (42 percent out of total). In Maharashtra, it is 33; Tamil Nadu 25; Andhra Pradesh, 31; and Gujarat 18 percent out of total output from all industries. (ASI, 1997-98).

A simple regression across states confirms that Foreign Technical collaborations approvals (FDI_TEC) has mainly gone to state with developed science and technology infrastructure in terms of industrial Research and Development expenditure as percentage of NSDP (RD) and stock of technical manpower (ENG). The regression below explains nearly 49 percent variations.

\[
\text{FDI}_{\text{TEC}} = 3.410 + 3.178 \text{RD}^* + 0.01132 \text{ENG}^* \quad (R^2=0.539*; \text{Adj } R^2=0.482 \text{ F}=9.359)
\]

\[
(8.315) \quad (2.792) \quad (2.505)
\]

*Significant at 5 percent level.
The figures in bracket is ‘t’ value of regression co-efficient

Other than the above-mentioned factors, we should also consider the changes that are taking place in the global economy, especially the new information technology (IT) that has been reshaping the global system. Addison and Rahman (2005) suggest that economies that successfully implement new Information and Communication Technology (ICT) might be able to overcome barriers that have long held them back in their contribution in global trade (example the limitation of a remote geography and an unfavourable climate). Reduced transport costs, improved marketing information and increased efficiency of industrial production are among the main benefits of ICT. Therefore IT needs to be considered in explaining FDI flows. In a recent study, Addison and Heshmati (2004) examined the determinants of FDI, using a large sample of countries. Their findings suggest that ICT increases inflows of FDI to developing countries mainly because ICT lowers the transaction and production costs of foreign investors, as well as improves their access to information. Abundant supply of labor, low wages, cheap satellite communications and the internet have been instrumental in the decision of foreign firms to

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establish their back office operations in states like Karnataka, Maharashtra, Tamil Nadu, and Andhra Pradesh. (Nirupam Bajpai et al., 1999)

7. Industrial Development:

Level of industrialization too is an important determinant of FDI in India. High FDI attracting states are also industrialized states (Maharashtra, Gujarat, Delhi, Tamil Nadu, and Karnataka). Industrial development Index has been constructed for three time periods as given in Table 7.5. The variables use to construct this Index are:

1) Urbanization
2) Number of factories per 100 square km of area.
3) Labour productivity (Net value added per industrial worker)
4) Output per Industrial Worker

The methodology is given in first chapter. The expected positive sign means higher level of industrialization should lead to more foreign investment flows into the state A very high co relation co-efficient of 0.912 (significant at 1 percent level) is observed between Per capita FDI approvals and Industrial Development Index. Level of urbanization and level of industrialization, as captured through (Industries per 100 sq km) is highly co-related (0.865), significant at 1 percent level). Highly urbanized states are also industrialized states in India (Delhi, Maharashtra, Tamil Nadu, Gujarat, and Karnataka). Himachal Pradesh, Assam, Bihar and Orissa are less urbanized states in India. A simple regression confirms that FDI has flown mainly to the urbanised (URB) states and to the states with large mining sectors (MIN) as a percent of NSDP (especially Orissa and Madhya Pradesh). The regression below explains 81 percent of variations.

\[
\text{PCFDI} = -842.402 + 37.773\text{URB}^{**} + 28.024\text{MIN} \\
R^2 = 0.831**; \text{ Adj } R^2 = 0.810; \text{ F}=39.399
\]

**Significant at 1 percent level.
The figure in bracket is 't' value of regression co-efficient

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Taken in total, these considerations suggest that urbanisation is likely to be a key determinant of economic growth as we would expect that already existent urban areas would be the preferred location for new investments in manufactures and services (Jeffrey D Sachs, et al, 2002). Labor productivity is almost 20 percent higher in the six states that have attracted the most FDI to the country compared to the rest of India (World Bank and IFC, 2004).

9) Export Oriented Units:

Number of Export Oriented Units in the state and size of exports indicates the openness of the state. More the EOU’s and exports, higher the openness. The state-wise distribution of 100 percent export-oriented units (EOUs) is also seen to be concentrated in the states attracting FDI. Table 7.6 shows, that out of a total of 4261 EOUs all over India as many as 2723 or 64 percent were located in five states that attracted FDI during post liberalization (Andhra Pradesh, Gujarat, Karnataka, Maharashtra and Tamil Nadu). Further, in terms of investment in EOU’s and employment too, these states rank higher than others. In terms of exports too, Tamil Nadu, Karnataka, Maharashtra, and Gujarat are the front-runners during 2000 to 2003 (Table 7.7).
### Table 7.6: State-wise Distribution of 100% Export Oriented Units (EOUs) in India (August, 1991 to December, 2003)

<table>
<thead>
<tr>
<th>States/UTs</th>
<th>Nos.</th>
<th>Percentage Share</th>
<th>Investment (Rs. in Crore)</th>
<th>Percentage Share</th>
<th>Employment (Numbers)</th>
<th>Percentage Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>458</td>
<td>10.75</td>
<td>42440</td>
<td>18.01</td>
<td>71961</td>
<td>10.72</td>
</tr>
<tr>
<td>Assam</td>
<td>2</td>
<td>0.05</td>
<td>36</td>
<td>0.02</td>
<td>647</td>
<td>0.1</td>
</tr>
<tr>
<td>Bihar</td>
<td>8</td>
<td>0.18</td>
<td>24</td>
<td>0.01</td>
<td>457</td>
<td>0.07</td>
</tr>
<tr>
<td>Delhi</td>
<td>113</td>
<td>2.55</td>
<td>1115</td>
<td>0.47</td>
<td>10601</td>
<td>1.58</td>
</tr>
<tr>
<td>Goa</td>
<td>29</td>
<td>0.66</td>
<td>530</td>
<td>0.22</td>
<td>3894</td>
<td>0.59</td>
</tr>
<tr>
<td>Gujarat</td>
<td>509</td>
<td>11.95</td>
<td>8627</td>
<td>3.66</td>
<td>64948</td>
<td>9.68</td>
</tr>
<tr>
<td>Haryana</td>
<td>238</td>
<td>5.59</td>
<td>4456</td>
<td>1.89</td>
<td>5254</td>
<td>0.78</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>34</td>
<td>0.8</td>
<td>2033</td>
<td>0.86</td>
<td>15077</td>
<td>2.25</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>1</td>
<td>0.02</td>
<td>3</td>
<td>0</td>
<td>34</td>
<td>0.01</td>
</tr>
<tr>
<td>Karnataka</td>
<td>507</td>
<td>11.47</td>
<td>8149</td>
<td>3.46</td>
<td>92815</td>
<td>13.83</td>
</tr>
<tr>
<td>Orissa</td>
<td>43</td>
<td>1.01</td>
<td>8140</td>
<td>3.45</td>
<td>19019</td>
<td>2.83</td>
</tr>
<tr>
<td>Pondicherry</td>
<td>18</td>
<td>0.42</td>
<td>516</td>
<td>0.22</td>
<td>2757</td>
<td>0.41</td>
</tr>
<tr>
<td>Punjab</td>
<td>133</td>
<td>3.14</td>
<td>3640</td>
<td>1.54</td>
<td>40495</td>
<td>6.03</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>233</td>
<td>5.47</td>
<td>5012</td>
<td>2.13</td>
<td>31247</td>
<td>4.66</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>676</td>
<td>15.86</td>
<td>61199</td>
<td>25.67</td>
<td>105238</td>
<td>16.28</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>261</td>
<td>6.13</td>
<td>17120</td>
<td>7.27</td>
<td>40369</td>
<td>5.99</td>
</tr>
<tr>
<td>West Bengal</td>
<td>118</td>
<td>2.77</td>
<td>2930</td>
<td>1.24</td>
<td>17365</td>
<td>2.59</td>
</tr>
<tr>
<td>State/UT not indicated</td>
<td>18</td>
<td>0.42</td>
<td>321</td>
<td>0.14</td>
<td>1592</td>
<td>0.24</td>
</tr>
<tr>
<td>India</td>
<td>4251</td>
<td>100.00</td>
<td>235832</td>
<td>100.00</td>
<td>471177</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Secretariat for Industrial Assistance, January 2004, Department of Industrial Policy & Promotion, Ministry of Commerce & Industry, Govt. of India.

Note: The data for newly created states of Jharkhand, Chattisgarh and Uttaranchal is included in former states.

### Table 7.7: State-wise Distribution of Export Oriented Units and Share in Exports in India (2000-2001 to 2002-2003)

<table>
<thead>
<tr>
<th>States/UTs</th>
<th>2000-01</th>
<th>2001-02</th>
<th>2002-03</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>166</td>
<td>711.27</td>
<td>1197.89</td>
</tr>
<tr>
<td>Assam</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Bihar</td>
<td>1</td>
<td>0.08</td>
<td>1</td>
</tr>
<tr>
<td>Gujarat</td>
<td>182</td>
<td>1017.5</td>
<td>1936.29</td>
</tr>
<tr>
<td>Haryana</td>
<td>59</td>
<td>500</td>
<td>512</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>8</td>
<td>160</td>
<td>118</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Karnataka</td>
<td>292</td>
<td>2800</td>
<td>3244.01</td>
</tr>
<tr>
<td>Kerala</td>
<td>34</td>
<td>489</td>
<td>804.02</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>78</td>
<td>910</td>
<td>950</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>197</td>
<td>2387</td>
<td>3126.34</td>
</tr>
<tr>
<td>Orissa</td>
<td>7</td>
<td>509.55</td>
<td>82.59</td>
</tr>
<tr>
<td>Punjab</td>
<td>42</td>
<td>769</td>
<td>809</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>76</td>
<td>400</td>
<td>460</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>286</td>
<td>2860</td>
<td>3209.16</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>82</td>
<td>1100</td>
<td>1170</td>
</tr>
<tr>
<td>West Bengal</td>
<td>52</td>
<td>237.04</td>
<td>518.36</td>
</tr>
<tr>
<td>Delhi</td>
<td>32</td>
<td>150</td>
<td>210</td>
</tr>
<tr>
<td>Goa</td>
<td>18</td>
<td>90.22</td>
<td>153.57</td>
</tr>
<tr>
<td>India</td>
<td>1556</td>
<td>19813</td>
<td>18734.45</td>
</tr>
</tbody>
</table>

Source: Ministry of Commerce, Government of India.

Note: The data for newly created states of Jharkhand, Chattisgarh and Uttaranchal is included in former states.
7.3 FDI Potential Index:

World Investment Report (2002) constructs an Index to rank countries according to their potential to attract FDI, called UNCTAD Inward FDI Potential Index, to capture a host of factors that can affect FDI. This Index uses eight variables, GDP per capita, Real GDP growth (for past 10 years), Exports as percentage of GDP, Number of telephone lines per 1000 inhabitants, Commercial energy use per capita, R&D expenditures as percentage of gross national income, Students in tertiary education as a percentage of total population, Country Risk, which includes the political and commercial risks related to investing in a country. Based on the World Investment Report pattern of Inward FDI Potential Index, FDI Potential Index has been constructed for 19 Indian states. The FDI Potential Index yields interesting results. This index is based largely on structural economic factors that tend to change fairly slowly over time. As a result the index values are fairly stable over time and correspond by and large to levels of economic development (WIR, 2002).

The FDI Potential Index for states uses 9 variables given in Table 7.8. This set of variables however doesn’t cover all-important factors affecting FDI and is not intended to provide a full-blown model of FDI location. Few variables possessing strong correlation with FDI flows has been selected for this Index. Also the availability of data set for the selected states is another important consideration for the selection of these variables. The relevance of the selected variables is already discussed in detail in second section. The variables used to construct FDI Potential Index for 19 states is given in Table 7.8.

Table 7.8: Variables used to construct FDI Potential Index for 19 Indian States

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PCNSDP</td>
</tr>
<tr>
<td>2</td>
<td>Per capita Consumption of Power</td>
</tr>
<tr>
<td>3</td>
<td>Telephones per 100 persons.</td>
</tr>
<tr>
<td>4</td>
<td>Tertiary Enrolment</td>
</tr>
<tr>
<td>5</td>
<td>Stock of Engineers/lakh population</td>
</tr>
<tr>
<td>6</td>
<td>Export Oriented Units (Percentage share out of total)</td>
</tr>
<tr>
<td>7</td>
<td>Research and Development Institutions/lakh population</td>
</tr>
<tr>
<td>8</td>
<td>Level of Industrialisation (Industrial Units per 100 square Kms.)</td>
</tr>
<tr>
<td>9</td>
<td>Urbanisation (Percentage)</td>
</tr>
</tbody>
</table>

Note: The year-wise Urbanisation and Research and Development Institutions has been worked out taking the growth rate of 1991 and 2001.

The methodology for constructing FDI Potential Index is outlined in the methodology of first chapter. The year-wise FDI Potential Index values are presented in Table 7.9 and the correlation co-efficient between per capita FDI approvals and FDI
Table 7.9: State-wise FDI Potential Index (1991 to 2003)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>0.231</td>
<td>0.255</td>
<td>0.251</td>
<td>0.260</td>
<td>0.246</td>
<td>0.263</td>
<td>0.272</td>
<td>0.285</td>
<td>0.296</td>
<td>0.292</td>
<td>0.299</td>
<td>0.306</td>
<td>0.299</td>
</tr>
<tr>
<td>Assam</td>
<td>0.070</td>
<td>0.066</td>
<td>0.076</td>
<td>0.087</td>
<td>0.098</td>
<td>0.104</td>
<td>0.106</td>
<td>0.112</td>
<td>0.108</td>
<td>0.082</td>
<td>0.062</td>
<td>0.082</td>
<td>0.081</td>
</tr>
<tr>
<td>Bihar</td>
<td>0.058</td>
<td>0.050</td>
<td>0.058</td>
<td>0.065</td>
<td>0.076</td>
<td>0.076</td>
<td>0.075</td>
<td>0.075</td>
<td>0.071</td>
<td>0.080</td>
<td>0.040</td>
<td>0.041</td>
<td>0.038</td>
</tr>
<tr>
<td>Gujarat</td>
<td>0.423</td>
<td>0.395</td>
<td>0.409</td>
<td>0.421</td>
<td>0.447</td>
<td>0.446</td>
<td>0.447</td>
<td>0.446</td>
<td>0.450</td>
<td>0.412</td>
<td>0.404</td>
<td>0.392</td>
<td>0.385</td>
</tr>
<tr>
<td>Haryana</td>
<td>0.322</td>
<td>0.318</td>
<td>0.311</td>
<td>0.312</td>
<td>0.324</td>
<td>0.335</td>
<td>0.344</td>
<td>0.338</td>
<td>0.349</td>
<td>0.331</td>
<td>0.344</td>
<td>0.330</td>
<td>0.344</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>0.094</td>
<td>0.107</td>
<td>0.128</td>
<td>0.152</td>
<td>0.193</td>
<td>0.224</td>
<td>0.246</td>
<td>0.274</td>
<td>0.284</td>
<td>0.261</td>
<td>0.256</td>
<td>0.292</td>
<td>0.293</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>0.101</td>
<td>0.088</td>
<td>0.094</td>
<td>0.121</td>
<td>0.123</td>
<td>0.126</td>
<td>0.125</td>
<td>0.129</td>
<td>0.127</td>
<td>0.099</td>
<td>0.079</td>
<td>0.091</td>
<td>0.101</td>
</tr>
<tr>
<td>Karnataka</td>
<td>0.375</td>
<td>0.377</td>
<td>0.377</td>
<td>0.384</td>
<td>0.402</td>
<td>0.411</td>
<td>0.409</td>
<td>0.426</td>
<td>0.449</td>
<td>0.436</td>
<td>0.475</td>
<td>0.393</td>
<td>0.388</td>
</tr>
<tr>
<td>Kerala</td>
<td>0.145</td>
<td>0.156</td>
<td>0.163</td>
<td>0.169</td>
<td>0.191</td>
<td>0.199</td>
<td>0.205</td>
<td>0.236</td>
<td>0.241</td>
<td>0.227</td>
<td>0.216</td>
<td>0.222</td>
<td>0.226</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>0.146</td>
<td>0.137</td>
<td>0.141</td>
<td>0.149</td>
<td>0.169</td>
<td>0.186</td>
<td>0.199</td>
<td>0.217</td>
<td>0.220</td>
<td>0.196</td>
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<td>0.477</td>
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<td>0.083</td>
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<td>0.062</td>
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<td>0.055</td>
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<td>0.363</td>
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<td>0.347</td>
<td>0.331</td>
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</tr>
<tr>
<td>Rajasthan</td>
<td>0.124</td>
<td>0.128</td>
<td>0.131</td>
<td>0.127</td>
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<td>0.175</td>
<td>0.159</td>
<td>0.145</td>
<td>0.152</td>
<td>0.155</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>0.353</td>
<td>0.344</td>
<td>0.346</td>
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<td>0.393</td>
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<td>0.493</td>
<td>0.483</td>
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<tr>
<td>Uttar Pradesh</td>
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<td>0.118</td>
<td>0.121</td>
<td>0.134</td>
<td>0.142</td>
<td>0.147</td>
<td>0.155</td>
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<td>0.134</td>
<td>0.112</td>
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<td>West Bengal</td>
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<td>0.143</td>
<td>0.140</td>
<td>0.145</td>
<td>0.145</td>
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<td>0.137</td>
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<td>0.147</td>
<td>0.150</td>
<td>0.171</td>
<td>0.173</td>
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<td>0.808</td>
<td>0.815</td>
<td>0.810</td>
<td>0.799</td>
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<td>0.752</td>
<td>0.775</td>
<td>0.764</td>
<td>0.787</td>
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<tr>
<td>Goa</td>
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<td>0.389</td>
<td>0.402</td>
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<td>0.498</td>
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<td>0.526</td>
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<td>0.465</td>
<td>0.501</td>
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<td>0.496</td>
</tr>
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Co-Relation with Per Capita FDI approvals: 0.727** 0.133 0.862** 0.826** 0.701** 0.813** 0.766** 0.806** 0.718** 0.673** 0.734** 0.486* 0.824**

Source: Appendix Table 7.1 and 7.6 **significant at 1% level and * significant at 5% level
Potential Index is given in the last row of the same table. The co-relation co-efficient between per capita FDI approvals and FDI Potential Index is very high and significant at 1 percent level for all years except 1992. The rankings of the states are in line with expectations. Delhi ranks first throughout the period. The high FDI potential Index for Maharashtra, Tamil Nadu, Karnataka and Gujarat throughout the study period is also in line with expectation (Table 7.10). Punjab, which has been grouped in low FDI attracting group and Haryana, which appears in Medium FDI attracting group ranks high due to high per capita income and well-developed infrastructure in these states. This means that these two high-income states have high potential for attracting FDI in the coming years. Delhi ranks first, followed by Goa and these two are exceptional states. The bottom 5 states are as expected less developed states (Jammu and Kashmir, Rajasthan, Uttar Pradesh, Assam and Bihar) that have failed as FDI destination during post liberalization.

7.4 Inward FDI Performance Index:

World Investment Report 2001 introduced an Inward FDI Index, which is the ratio of a country’s share in global FDI flows to its share in global GDP. Table 7.11 presents FDI Inward Performance Index for Indian States and Union Territories. The FDI Inward Performance Index used here is the ratio of a state’s and UT’s share in FDI approvals to India’s divided by states share in NDP of India (See methodology in first chapter).

States with an index value of 1 receive exactly in line with their economic size. States with more than Index value of 1 attract more FDI than may be expected on the basis of relative NSDP. Such states may have exceptionally welcoming regulatory regimes, be well managed in macroeconomic terms, or have efficient infrastructure, good growth prospects, rich in natural resources, Research and Development capabilities and skilled labour or may have favourable location for exporting to large markets. However, the Inward FDI Performance Index must be treated with care as an indicator of state’s position to attract more FDI. Some states may receive huge FDI approvals for short period for a year or so because of the presence of natural resources (Orissa for example, which is rich in mineral and water resources). Even states with steady FDI performance may change ranks due to changes in amount of FDI approved. The year-wise co-relation coefficient of Inward FDI Performance Index and FDI Potential Index to has been worked out and presented in the last row of Table 7.11. The high co-relation shows that the states that exhibit high value of FDI Potential Index, are also the states that have performed well in terms of FDI Performance Index during Post liberalization. For instance, (Delhi,
Table 7.10: Rankings of States Based on FDI Potential Index

<table>
<thead>
<tr>
<th>Year</th>
<th>Delhi</th>
<th>Maharashtra</th>
<th>Gujarat</th>
<th>Goa</th>
<th>Tamil Nadu</th>
<th>Karnataka</th>
<th>Karnataka</th>
<th>Madhya Pradesh</th>
<th>West Bengal</th>
<th>Rajasthan</th>
<th>Jammu &amp; Kashmir</th>
<th>Assam</th>
<th>Bihar</th>
<th>Orissa</th>
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<tr>
<td>2003</td>
<td>Delhi</td>
<td>Delhi</td>
<td>Tamil Nadu</td>
<td>Goa</td>
<td>Maharashtra</td>
<td>Tamil Nadu</td>
<td>Karnataka</td>
<td>Karnataka</td>
<td>Madhya Pradesh</td>
<td>West Bengal</td>
<td>Rajasthan</td>
<td>Jammu &amp; Kashmir</td>
<td>Assam</td>
<td>Bihar</td>
</tr>
<tr>
<td>2002</td>
<td>Delhi</td>
<td>Delhi</td>
<td>Tamil Nadu</td>
<td>Goa</td>
<td>Maharashtra</td>
<td>Tamil Nadu</td>
<td>Karnataka</td>
<td>Karnataka</td>
<td>Madhya Pradesh</td>
<td>West Bengal</td>
<td>Rajasthan</td>
<td>Jammu &amp; Kashmir</td>
<td>Assam</td>
<td>Bihar</td>
</tr>
<tr>
<td>2001</td>
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<td>Delhi</td>
<td>Tamil Nadu</td>
<td>Goa</td>
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<td>Tamil Nadu</td>
<td>Karnataka</td>
<td>Karnataka</td>
<td>Madhya Pradesh</td>
<td>West Bengal</td>
<td>Rajasthan</td>
<td>Jammu &amp; Kashmir</td>
<td>Assam</td>
<td>Bihar</td>
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<td>2000</td>
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<td>Goa</td>
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<td>Karnataka</td>
<td>Karnataka</td>
<td>Madhya Pradesh</td>
<td>West Bengal</td>
<td>Rajasthan</td>
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<td>Bihar</td>
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<tr>
<td>1999</td>
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<td>Delhi</td>
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<td>Goa</td>
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<td>Tamil Nadu</td>
<td>Karnataka</td>
<td>Karnataka</td>
<td>Madhya Pradesh</td>
<td>West Bengal</td>
<td>Rajasthan</td>
<td>Jammu &amp; Kashmir</td>
<td>Assam</td>
<td>Bihar</td>
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<tr>
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<td>Tamil Nadu</td>
<td>Karnataka</td>
<td>Karnataka</td>
<td>Madhya Pradesh</td>
<td>West Bengal</td>
<td>Rajasthan</td>
<td>Jammu &amp; Kashmir</td>
<td>Assam</td>
<td>Bihar</td>
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<tr>
<td>1997</td>
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<td>Delhi</td>
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<td>Goa</td>
<td>Maharashtra</td>
<td>Tamil Nadu</td>
<td>Karnataka</td>
<td>Karnataka</td>
<td>Madhya Pradesh</td>
<td>West Bengal</td>
<td>Rajasthan</td>
<td>Jammu &amp; Kashmir</td>
<td>Assam</td>
<td>Bihar</td>
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<td>Karnataka</td>
<td>Madhya Pradesh</td>
<td>West Bengal</td>
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<td>Jammu &amp; Kashmir</td>
<td>Assam</td>
<td>Bihar</td>
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<td>Karnataka</td>
<td>Karnataka</td>
<td>Madhya Pradesh</td>
<td>West Bengal</td>
<td>Rajasthan</td>
<td>Jammu &amp; Kashmir</td>
<td>Assam</td>
<td>Bihar</td>
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<td>Karnataka</td>
<td>Madhya Pradesh</td>
<td>West Bengal</td>
<td>Rajasthan</td>
<td>Jammu &amp; Kashmir</td>
<td>Assam</td>
<td>Bihar</td>
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<td>Goa</td>
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<td>Tamil Nadu</td>
<td>Karnataka</td>
<td>Karnataka</td>
<td>Madhya Pradesh</td>
<td>West Bengal</td>
<td>Rajasthan</td>
<td>Jammu &amp; Kashmir</td>
<td>Assam</td>
<td>Bihar</td>
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<td>Delhi</td>
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<td>Goa</td>
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<td>Karnataka</td>
<td>Madhya Pradesh</td>
<td>West Bengal</td>
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<td>Karnataka</td>
<td>Madhya Pradesh</td>
<td>West Bengal</td>
<td>Rajasthan</td>
<td>Jammu &amp; Kashmir</td>
<td>Assam</td>
<td>Bihar</td>
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Source: Table 7.9
Table 7.11: State-wise Inward FDI Performance Index (1991 to 2003)

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<td>0.777</td>
<td>1.094</td>
<td>0.379</td>
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<td>0.258</td>
<td>0.680</td>
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<td>0.000</td>
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<td>0.000</td>
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<td>0.000</td>
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<td>0.034</td>
<td>0.532</td>
<td>0.014</td>
<td>0.030</td>
<td>0.002</td>
<td>0.001</td>
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<td>0.122</td>
<td>0.150</td>
<td>0.042</td>
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<td>0.086</td>
<td>0.005</td>
<td>0.008</td>
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<td>0.002</td>
<td>-4.94</td>
</tr>
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<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.030</td>
<td>0.000</td>
<td>0.000</td>
<td>0.002</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>-0.01</td>
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<td>1.082</td>
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<td>0.363</td>
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<td>0.076</td>
<td>-0.36</td>
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<td>0.458</td>
<td>0.034</td>
<td>0.418</td>
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<td>0.371</td>
<td>1.146</td>
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<td>0.801</td>
<td>0.716</td>
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<td>1.395</td>
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<td>0.020</td>
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<td>0.635</td>
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<td>0.994</td>
<td>1.334</td>
<td>1.451</td>
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<td>Co-Relation</td>
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<td>0.981**</td>
<td>0.768**</td>
<td>0.931**</td>
<td>0.994**</td>
<td>0.876**</td>
<td>0.654**</td>
<td>0.872**</td>
<td>0.976**</td>
<td>0.430</td>
<td>0.911**</td>
<td>0.943**</td>
<td>0.941**</td>
<td>* *</td>
</tr>
</tbody>
</table>

Source: Appendix Table 5.1 and 7.2**significant at 1% level and * significant at 5% level
Maharashtra, Gujarat, Karnataka and Tamil Nadu). However, in 2000, the co-relation is not significant because of low Performance Index value recorded by Gujarat and Delhi too.

The index values for states shows tremendous ups and downs. This is because of fluctuations in the amount of FDI approved during various years. For example, states like Himachal Pradesh approved huge amount of FDI in 1992 and 2002 and this accounts for high value of Index during that particular year. Delhi has maintained more or less stability throughout the post liberalization period. The Index value for Delhi during the first five periods is very high. This large Index value is due to the reason that in about 30 percent of cases, the exact location of was not indicated at the time of approval. These projects account for nearly one-third of total investment. (S.K.Goyal, 1999). Later on the exact location of the state was identified. The Index value for Delhi has declined substantially during 1996 as the exact investment location has been specified at the time of approval. Maharashtra is the only state to have maintained stability and sustained good performance over time. Poor state like Orissa records high Index value during 1993 and 1997 as it received a surge of FDI mainly in power sector during that period. Karnataka has maintained stability from 1996 onwards. This is mainly due to large FDI flows to IT sector and the sustainability of the same. Tamil Nadu also has index value of more than one and has maintained consistent performance. The high Index value for small state of Goa and Himachal Pradesh is due to huge FDI approvals in Telecommunications. Largely because of the influence of short-term factors, Performance Index rankings change dramatically over the periods. It should be noted that the shifts in ranks reflect not only relative changes in FDI approvals but also in relative NSDP. States like Orissa and West Bengal attracted significant FDI approvals during some periods, but failed to improve their investment climates in subsequent periods and compete effectively for FDI with other states. Only relatively well-developed states tend to sustain similar ranks (Maharashtra, Tamil Nadu, and Karnataka) overtime, while poor states like Orissa and West Bengal make large upward or downward leaps. In general, the states that have been classified as High FDI attracting states have maintained a consistent performance throughout the study period examined here. In other words, the states with high Potential Index value, tend to sustain their positions as FDI attracting states.
Among the 19 states, the highest growth rate in Inward FDI Performance Index is recorded by Karnataka (23.49 percent per annum), followed by Tamil Nadu (12.86 percent per annum); Goa (10.36 percent per annum); Maharashtra (9.46 percent per annum); Gujarat, Haryana and Andhra Pradesh record 6.52 and 6.13 and 4.37 percent per annum respectively. Himachal Pradesh, Orissa, Uttar Pradesh and West Bengal record negative growth during the said period (Table 7.11 last column). Delhi records a low growth rate of 1.44 percent during the said period. Thus the Southern states and Western states record a high growth in this Index than Northern states.

7.5 Regression Analysis for Determinants of FDI Across States:

After discussing the various factors that affect FDI flows across states in India, the present section deals with the regression analysis. To capture the relative importance of explanatory variables either on per capita FDI approvals and Inward FDI Performance Index as dependent variables, two separate regressions are run, for three time periods viz, 1991-92, 1995-96 and 2001-02. The inter-relationship between the various explanatory variables is presented in Tables 7.12, 7.13 and 7.13 for three years, viz 1991-92, 1995-96 and 2001-02. These correlations are based on observations relating to 19 states of India. The calculated coefficient of correlation between per capita FDI approvals and Inward FDI Performance Index is presented in the same tables for three time periods in the last two rows of the Tables.

The correlation results reveal that per capita FDI approvals are positively and significantly associated with Infrastructure Index, Industrial Development Index, PCNSDP, and Research and Development Institutions during all the three periods. Quality of human capital is insignificant during 1995-96 only. As expected, the correlation between Fiscal imbalance and FDI flows is negative throughout the study period. The association between the presence of Export Oriented Units as percentage of total industrial units and FDI flows in a state is positive but not significant during all the three time periods chosen for study. Although the stock of Engineer's is positive, it is not very significant. A new variable of Information and Communication Technologies (ICT) is added in 2001-02, which shows high and significant correlation with per capita FDI approvals across states.

Since the present study explores various explanatory variables, the problem of multicollinearity is bound to arise due to inter-correlation between the explanatory variables. Infrastructure Index is highly correlated with Industrial Index, PCNSDP,
Tertiary Enrolment during first period and with Research and Development Institutions during 1995-96 and 2001-02, and with ICT during 2001-02. Similarly, Industrial Development Index is highly co-related with infrastructure index, Per capita NSDP and Research and Development Institutions during 1991-92 and 1995-96 and 2001-02 and the same is highly associated with ICT during 2001-02. Further, the coefficient of correlation between Inward FDI Performance Index and various explanatory variables are calculated and presented in last row of the said tables. From the results it is clear that Infrastructure Index, Industrial Development Index, ICT, Per capita Income, Quality of human capital, Research and Development Institutions and Per capita development expenditure shows a definite and positive correlation with Inward FDI Performance Index. for 1995-96 and 2001-02. Thus some of the inter related variables have been removed from the regression equations.

Table 7.12: Coefficient of Correlation Matrix of Variables of Factors Determining FDI Across States (1991-92)

<table>
<thead>
<tr>
<th></th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>X5</th>
<th>X6</th>
<th>X7</th>
<th>X8</th>
<th>X9</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>1.000</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>X3</td>
<td>0.829</td>
<td>0.746</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X4</td>
<td>0.075</td>
<td>0.181</td>
<td>0.769</td>
<td>0.137</td>
<td>1.000</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>X5</td>
<td>0.891</td>
<td>0.697</td>
<td>0.769</td>
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<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X6</td>
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<td>0.629</td>
<td>0.816</td>
<td>0.400</td>
<td>0.717</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>X7</td>
<td>0.194</td>
<td>0.221</td>
<td>0.472</td>
<td>0.241</td>
<td>0.305</td>
<td>0.294</td>
<td>1.000</td>
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</tr>
<tr>
<td>X8</td>
<td>-0.274</td>
<td>-0.250</td>
<td>-0.240</td>
<td>-0.093</td>
<td>-0.190</td>
<td>-0.403</td>
<td>-0.390</td>
<td>-0.403</td>
<td>1.000</td>
</tr>
<tr>
<td>X9</td>
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<td>0.180</td>
<td>0.400</td>
<td>0.321</td>
<td>0.135</td>
<td>0.401</td>
<td>0.736</td>
<td>0.100</td>
<td>1.000</td>
</tr>
<tr>
<td>Yfdi</td>
<td>0.831</td>
<td>0.876</td>
<td>0.728</td>
<td>0.011</td>
<td>0.802</td>
<td>0.705</td>
<td>0.271</td>
<td>-0.135</td>
<td>0.320</td>
</tr>
<tr>
<td>Ypi</td>
<td>0.473</td>
<td>0.555</td>
<td>0.411</td>
<td>-0.111</td>
<td>0.413</td>
<td>-0.444</td>
<td>0.150</td>
<td>0.011</td>
<td>0.349</td>
</tr>
</tbody>
</table>

Source: Appendix Tables 7.1 to 7.7

Table 7.13: Coefficient of Correlation Matrix of Variables of Factors Determining FDI Across States (1995-96):

<table>
<thead>
<tr>
<th></th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>X5</th>
<th>X6</th>
<th>X7</th>
<th>X8</th>
<th>X9</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td>0.732</td>
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<tr>
<td>X4</td>
<td>0.225</td>
<td>0.200</td>
<td>0.383</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>X5</td>
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<td>0.513</td>
<td>0.741</td>
<td>0.317</td>
<td>1.000</td>
<td></td>
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</tr>
<tr>
<td>X6</td>
<td>0.831</td>
<td>0.835</td>
<td>0.767</td>
<td>0.333</td>
<td>0.698</td>
<td>1.000</td>
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</tr>
<tr>
<td>X7</td>
<td>0.173</td>
<td>0.100</td>
<td>0.580</td>
<td>0.273</td>
<td>0.648</td>
<td>0.362</td>
<td>1.000</td>
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<tr>
<td>X8</td>
<td>-0.252</td>
<td>-0.256</td>
<td>-0.221</td>
<td>-0.402</td>
<td>-0.110</td>
<td>-0.109</td>
<td>-0.009</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>X9</td>
<td>0.172</td>
<td>0.167</td>
<td>0.511</td>
<td>0.433</td>
<td>0.480</td>
<td>0.335</td>
<td>0.726</td>
<td>0.248</td>
<td>1.000</td>
</tr>
<tr>
<td>Yfdi</td>
<td>0.951</td>
<td>0.979</td>
<td>0.654</td>
<td>0.193</td>
<td>0.430</td>
<td>0.824</td>
<td>0.014</td>
<td>-0.208</td>
<td>0.062</td>
</tr>
<tr>
<td>Ypi</td>
<td>0.920</td>
<td>0.952</td>
<td>0.643</td>
<td>0.192</td>
<td>0.373</td>
<td>0.805</td>
<td>-0.049</td>
<td>-0.243</td>
<td>0.039</td>
</tr>
</tbody>
</table>

Source: Appendix Tables 7.1 to 7.7
Table 7.14 Coefficient of Correlation Matrix of Variables of Factors Determining FDI Across States (2001-02)

<table>
<thead>
<tr>
<th></th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>X5</th>
<th>X6</th>
<th>X7</th>
<th>X8</th>
<th>X9</th>
<th>X10</th>
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</thead>
<tbody>
<tr>
<td>X1</td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X3</td>
<td>0.836</td>
<td>0.783</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X4</td>
<td>0.402</td>
<td>0.410</td>
<td>0.549</td>
<td>0.387</td>
<td>1.000</td>
<td></td>
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</tr>
<tr>
<td>X5</td>
<td>0.827</td>
<td>0.866</td>
<td>0.754</td>
<td>0.411</td>
<td>0.643</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X6</td>
<td>0.292</td>
<td>0.262</td>
<td>0.673</td>
<td>0.235</td>
<td>0.475</td>
<td>0.390</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X7</td>
<td>0.391</td>
<td>0.387</td>
<td>0.311</td>
<td>0.604</td>
<td>0.048</td>
<td>0.225</td>
<td>0.245</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X8</td>
<td>0.187</td>
<td>0.245</td>
<td>0.448</td>
<td>0.436</td>
<td>0.655</td>
<td>0.395</td>
<td>0.498</td>
<td>0.067</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>X9</td>
<td>0.949</td>
<td>0.975</td>
<td>0.724</td>
<td>0.314</td>
<td>0.369</td>
<td>0.851</td>
<td>0.179</td>
<td>0.423</td>
<td>0.115</td>
<td>1.000</td>
</tr>
<tr>
<td>X10</td>
<td>0.861</td>
<td>0.887</td>
<td>0.892</td>
<td>0.368</td>
<td>0.589</td>
<td>0.832</td>
<td>0.599</td>
<td>0.184</td>
<td>0.438</td>
<td>0.830</td>
</tr>
<tr>
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<td>0.752</td>
<td>0.389</td>
<td>0.713</td>
<td>0.827</td>
<td>0.565</td>
<td>0.026</td>
<td>0.583</td>
<td>0.663</td>
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</tbody>
</table>

Source: Appendix Tables 7.1 to 7.7

Regression Models:

After solving the problem of multicollinearity, the below equations were selected as the best in terms of both $\overline{R}^2$ and t values of coefficients, by employing Least Squares method. Since per capita approvals show variability during, study periods chosen, separate equations have been estimated for the three time periods as follows:

Regression Equations for 1991-92

\[
Y_{ro1} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_7 X_7 + u \quad \text{... (1)}
\]

\[
Y_{ro2} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_6 X_6 + \beta_8 X_8 + \beta_9 X_9 + u \quad \text{... (2)}
\]

\[
Y_{ro3} = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_7 X_7 + \beta_8 X_8 + u \quad \text{... (3)}
\]

\[
Y_{ro4} = \alpha + \beta_1 X_1 + \beta_3 X_3 + \beta_4 X_4 + \beta_7 X_7 + \beta_9 X_9 + u \quad \text{... (4)}
\]

\[
Y_{ro5} = \alpha + \beta_1 X_1 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_9 X_9 + u \quad \text{... (5)}
\]

Regression Equations for 1995-96

\[
Y_{ro1} = \alpha + \beta_1 X_1 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + u \quad \text{... (1)}
\]

\[
Y_{ro2} = \alpha + \beta_2 X_2 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + u \quad \text{... (2)}
\]

\[
Y_{ro3} = \alpha + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + u \quad \text{... (3)}
\]

\[
Y_{ro4} = \alpha + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + u \quad \text{... (4)}
\]

Regression Equations for 2001-02

\[
Y_{ro1} = \alpha + \beta_1 X_1 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + u \quad \text{... (1)}
\]

\[
Y_{ro2} = \alpha + \beta_2 X_2 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_9 X_9 + u \quad \text{... (2)}
\]

\[
Y_{ro3} = \alpha + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_9 X_9 + u \quad \text{... (3)}
\]

\[
Y_{ro4} = \alpha + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + u \quad \text{... (5)}
\]
Where,
$Y_{fw}$ = Per Capita FDI Approvals (Rs.)
$Y_n$ = Inward FDI Performance Index
$X_1$ = Infrastructure Index.
$X_2$ = Industrial Development Index.
$X_3$ = PCNSDP (Rs.)
$X_4$ = Engineers per lakh population
$X_5$ = Tertiary Enrolment per lakh population.
$X_6$ = Research and Development Institutions per lakh population
$X_7$ = Per capita Development Expenditure
$X_8$ = Fiscal Deficit (% of NSDP).
$X_9$ = Export Oriented Units (as % of total Industrial Units in a state).
$X_{10}$ = Information and Communication Technology (ICT) (Internet Subscribers per lakh population).

$\alpha$'s and $\beta$'s are the parameters that have been estimated and the results of these equations are presented in Tables 7.15, 7.16 and 7.17. Regressions for two variables viz Per Capita FDI Approvals and each of the explanatory variables are also run and the same results are given in Table 7.18 for three time periods chosen for the study.

The first 2 equations of Table 7.15 shows that the selected variables explain 70 to 79 percent of factors that determine the location of FDI during 1991-92. The regression results points out that Infrastructure Index, Industrial development Index and Research and Development Institutions are the significant variables that explains the location of FDI. The regression co-efficients of infrastructure index, Industrial development index, PCNSDP, Research and Development are significant at 1 percent level. Similar results were also found when per capita FDI approvals were regressed on these individual variables (Table 7.18).

In the third equation, PCI is significant at 1 percent level but explains only 46 percent. This shows that mere PCNSDP is not sufficient to explain the location of FDI. Punjab and Haryana are the clear examples in this regard. In the last two equations, quality of human capital is significant at 1 percent level. When associated with the presence of Research and Development Institutions also, quality of human capital turns out significant. Although Development expenditure is positive in first and fourth equation, it is not significant when associated with other variables. Individually also, it is not significant. However, engineers, development expenditure and presence of export
oriented units though is positive, seems to have no significant impact on attracting FDI during the initial period of post liberalization as is these variables have no significant impact either individually or when associated with other factors.

For the year 1995-96 also, the same variables viz, Infrastructure Index, Industrial Development Index, Research and Development Institutions explains the location of FDI across states. The first two equations points out that only two variables viz., Infrastructure and Industrial development explains nearly 90 to 95 percent of factors that explain FDI location. Individually too, they are significant at 1 percent level. PCNSDP and Research and Development Institutions are the only significant variables in third and fourth equations.

An interesting observation during 2001-02 is that when combined with other variables, Per capita Development expenditure turns out highly significant, although individually it is not very significant. This leads to the conclusion that Public Investment drives Private Foreign Investment. This also points out to the growing competition among states to attract FDI by way of providing the basic facilities (investment in economic and social overheads, transport, communication, development of science and technology so on and so forth) to foreign investors. Infrastructure Index, Industrial Development Index, ICT, Per capita NSDP and Research and Development Institutions turn out significant factors in explaining the locational choice of FDI. Individually also these factors are significant at 1 percent level and when combined with others also, they turn out significant during 2001-02.

Thus the regression results confirms that the availability of Infrastructure, Industrial development, Science and Technology Development as captured through the Research and Development Institutions, are the main factors for the location of FDI throughout the study period. Market size (PCNSDP), availability of quality human capital are the other factors that determine FDI during 1991-92. During 1995-96 also, the same factors holds good except that Tertiary Enrolment is not significant. During 2001-02, the same factors along with development of Information and Communication Technologies (ICT) also turns out significant factor. This highlights the important role of development of new IT sector in attracting FDI. Along with these, the role of governance as captured through per capita development expenditure is also a significant factor.
### Table 7.15: Multiple Regression Analysis of Factors Determining FDI Across States for 1991-92

<table>
<thead>
<tr>
<th>Eq. No.</th>
<th>Equations</th>
<th>R²</th>
<th>Adj R²</th>
<th>F</th>
<th>Source: Appendix tables 7.1 to 7.7</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Eq. No.</td>
<td>R²</td>
<td>Adj R²</td>
<td>F</td>
<td>Source: Appendix tables 7.1 to 7.7</td>
</tr>
<tr>
<td>2</td>
<td>Eq. No.</td>
<td>R²</td>
<td>Adj R²</td>
<td>F</td>
<td>Source: Appendix tables 7.1 to 7.7</td>
</tr>
<tr>
<td>3</td>
<td>Eq. No.</td>
<td>R²</td>
<td>Adj R²</td>
<td>F</td>
<td>Source: Appendix tables 7.1 to 7.7</td>
</tr>
<tr>
<td>4</td>
<td>Eq. No.</td>
<td>R²</td>
<td>Adj R²</td>
<td>F</td>
<td>Source: Appendix tables 7.1 to 7.7</td>
</tr>
<tr>
<td>5</td>
<td>Eq. No.</td>
<td>R²</td>
<td>Adj R²</td>
<td>F</td>
<td>Source: Appendix tables 7.1 to 7.7</td>
</tr>
</tbody>
</table>

Note: Figures in Brackets are 't' values of Regression co-efficients. **Significant at 1% level and * Significant at 5% level

### Table 7.16: Factors Determining FDI Across States for 1995-96

<table>
<thead>
<tr>
<th>Eq. No.</th>
<th>Equations</th>
<th>R²</th>
<th>Adj R²</th>
<th>F</th>
<th>Source: Appendix tables 7.1 to 7.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Eq. No.</td>
<td>R²</td>
<td>Adj R²</td>
<td>F</td>
<td>Source: Appendix tables 7.1 to 7.7</td>
</tr>
<tr>
<td>2</td>
<td>Eq. No.</td>
<td>R²</td>
<td>Adj R²</td>
<td>F</td>
<td>Source: Appendix tables 7.1 to 7.7</td>
</tr>
<tr>
<td>3</td>
<td>Eq. No.</td>
<td>R²</td>
<td>Adj R²</td>
<td>F</td>
<td>Source: Appendix tables 7.1 to 7.7</td>
</tr>
<tr>
<td>4</td>
<td>Eq. No.</td>
<td>R²</td>
<td>Adj R²</td>
<td>F</td>
<td>Source: Appendix tables 7.1 to 7.7</td>
</tr>
</tbody>
</table>

Note: Figures in Brackets are 't' values of Regression co-efficients. **Significant at 1% level and * Significant at 5% level
**Table 7.17: Factors Determining FDI Across States. Regression Co-efficients for 2001-02**

(Dependent Variable: Per capita FDI Approval)

<table>
<thead>
<tr>
<th>Eq. No.</th>
<th>Equations</th>
<th>( R^2 )</th>
<th>Adj ( R^2 )</th>
<th>( F )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-0.0885 (+0.0005379 X_1, X_4, X_7)</td>
<td>0.890**</td>
<td>0.848</td>
<td>21.016</td>
</tr>
<tr>
<td>2</td>
<td>-0.496 (+0.0001551 X_4)</td>
<td>0.926**</td>
<td>0.905</td>
<td>43.894</td>
</tr>
<tr>
<td>3</td>
<td>-0.371 (+0.0002546 X_3, X_7)</td>
<td>0.678*</td>
<td>0.554</td>
<td>5.464</td>
</tr>
<tr>
<td>4</td>
<td>0.792 (+3.815 X_6, X_8)</td>
<td>0.795**</td>
<td>0.716</td>
<td>10.080</td>
</tr>
</tbody>
</table>

**Source:** Appendix tables 7.1 to 7.7

Note: Figures in Brackets are 't' values of Regression co-efficients. **Significant at 1% level and * Significant at 5% level

---

**Table 7.18: Factors Determining FDI Across States. Regression Co-efficients for 1995-96**

(Dependent Variable: Inward FDI Performance Index)

<table>
<thead>
<tr>
<th>Eq. No.</th>
<th>Equations</th>
<th>( R^2 )</th>
<th>Adj ( R^2 )</th>
<th>( F )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-3.289 (+0.143 X_1, +0.09037 X_5, +1.626 X_8)</td>
<td>0.175**</td>
<td>0.129</td>
<td>7.228</td>
</tr>
<tr>
<td>2</td>
<td>-3.740 (+0.159 X_4, +0.107 X_6)</td>
<td>0.188**</td>
<td>0.141</td>
<td>10.432</td>
</tr>
<tr>
<td>3</td>
<td>-3.128 (+0.08359 X_4, +0.117 X_8)</td>
<td>0.199**</td>
<td>0.152</td>
<td>11.523</td>
</tr>
<tr>
<td>4</td>
<td>-3.891 (+1.625 X_8)</td>
<td>0.207**</td>
<td>0.159</td>
<td>12.439</td>
</tr>
<tr>
<td>5</td>
<td>-4.371 (-0.0114 X_7, +0.02965 X_7, +0.0129 X_8)</td>
<td>0.218**</td>
<td>0.170</td>
<td>13.542</td>
</tr>
</tbody>
</table>

**Source:** Appendix tables 7.1 to 7.7

Note: Figures in Brackets are 't' values of Regression co-efficients. **Significant at 1% level and * Significant at 5% level
Table 7.18: Regressions Results of Two Variables for 1991-92, 1995-96 and 2001-02.
(Dependent Variable: Per Capita FDI Approvals)

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Equation</th>
<th>1991-92</th>
<th>1995-96</th>
<th>2001-02</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>R²</td>
<td>Adj.R²</td>
<td>F</td>
</tr>
<tr>
<td>1</td>
<td>-21.937 + 16.789X₁**</td>
<td>0.691**</td>
<td>0.673</td>
<td>38.027</td>
</tr>
<tr>
<td></td>
<td>(6.167)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-34.374 + 25.907X₁**</td>
<td>0.767**</td>
<td>0.754</td>
<td>56.095</td>
</tr>
<tr>
<td></td>
<td>(7.490)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>-87.621 + 0.02282X₁</td>
<td>0.530**</td>
<td>0.502</td>
<td>19.161</td>
</tr>
<tr>
<td></td>
<td>(4.377)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>53.038 + 0.02677X₁</td>
<td>0.000</td>
<td>-0.059</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(0.045)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>-19.089 + 0.154X₁**</td>
<td>0.643**</td>
<td>0.622</td>
<td>30.571</td>
</tr>
<tr>
<td></td>
<td>(5.529)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>-13.353 + 200.840X₁**</td>
<td>0.496**</td>
<td>0.467</td>
<td>16.743</td>
</tr>
<tr>
<td></td>
<td>(4.092)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>32.822 + 0.01798X₁*</td>
<td>0.073</td>
<td>0.019</td>
<td>1.347</td>
</tr>
<tr>
<td></td>
<td>(1.161)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>74.241 - 3.767X₁</td>
<td>0.018</td>
<td>-0.040</td>
<td>0.315</td>
</tr>
<tr>
<td></td>
<td>(-0.562)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>22.501 + 9.972X₁*</td>
<td>0.102</td>
<td>0.050</td>
<td>1.939</td>
</tr>
<tr>
<td></td>
<td>(1.393)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-6.815.91 + 257.798 X₁**</td>
<td>0.905**</td>
<td>0.899</td>
<td>161.743</td>
</tr>
<tr>
<td></td>
<td>(12.718)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>-823.253 + 389.622 X₁**</td>
<td>0.959**</td>
<td>0.957</td>
<td>397.942</td>
</tr>
<tr>
<td></td>
<td>(19.949)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>-1056.939 + 0.146 X₁**</td>
<td>0.428*</td>
<td>0.395</td>
<td>12.739</td>
</tr>
<tr>
<td></td>
<td>(3.569)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>216.673 + 5.753 X₁</td>
<td>0.037</td>
<td>0.020</td>
<td>0.654</td>
</tr>
<tr>
<td></td>
<td>(0.809)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>-754.098 + 2.201 X₁*</td>
<td>0.185</td>
<td>0.137</td>
<td>3.852</td>
</tr>
<tr>
<td></td>
<td>(1.963)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>-650.305 + 2820.510 X₁**</td>
<td>0.678**</td>
<td>0.659</td>
<td>35.796</td>
</tr>
<tr>
<td></td>
<td>(5.983)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>475.852 + 0.01917 X₁</td>
<td>0.000</td>
<td>0.059</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>(0.059)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>1151.563 - 170.783 X₁</td>
<td>-0.072</td>
<td>0.017</td>
<td>1.316</td>
</tr>
<tr>
<td></td>
<td>(-1.147)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>406.704 + 34.132 X₁</td>
<td>0.004</td>
<td>-0.055</td>
<td>0.066</td>
</tr>
<tr>
<td></td>
<td>(0.256)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Appendix tables 7. (Figures in Brackets are 't' values)
**Significant at 1% level  * Significant at 5% level.
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Table 7.20: Factors Determining FDI Across States Regression Co-efficients for 2001-02
(FDI Performance Index Equations (2001-02)
(Dependent Variable: Inward FDI Performance Index)

<table>
<thead>
<tr>
<th>Eq. No.</th>
<th>Equations</th>
<th>R²</th>
<th>Adj R²</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-1.550</td>
<td>-0.0000495 X₄</td>
<td>0.001895 X₅</td>
<td>0.0006468 X₇</td>
</tr>
<tr>
<td></td>
<td>(3.516)</td>
<td>(-0.192)</td>
<td>(2.632)</td>
<td>(0.355)</td>
</tr>
<tr>
<td>2</td>
<td>-1.551</td>
<td>-0.000136 X₄</td>
<td>0.001938 X₅</td>
<td>0.0007830 X₇</td>
</tr>
<tr>
<td></td>
<td>(3.795)</td>
<td>(-0.056)</td>
<td>(2.844)</td>
<td>(0.623)</td>
</tr>
<tr>
<td>3</td>
<td>-1.235</td>
<td>-0.00004825 X₉</td>
<td>0.001795 X₅</td>
<td>0.0009724 X₇</td>
</tr>
<tr>
<td></td>
<td>(3.585)</td>
<td>(-0.186)</td>
<td>(2.506)</td>
<td>(0.753)</td>
</tr>
<tr>
<td>4</td>
<td>-1.620</td>
<td>-0.00004902 X₄</td>
<td>0.002197 X₅</td>
<td>0.0001112 X₇</td>
</tr>
<tr>
<td></td>
<td>(2.082)</td>
<td>(-0.304)</td>
<td>(2.575)</td>
<td>(-0.574)</td>
</tr>
<tr>
<td>5</td>
<td>-1.048</td>
<td>-0.000800 X₄</td>
<td>2.163 X₅</td>
<td>0.0000453 X₇</td>
</tr>
<tr>
<td></td>
<td>(-0.388)</td>
<td>(2.154)</td>
<td>(0.431)</td>
<td>(1.758)</td>
</tr>
</tbody>
</table>

Source: Appendix tables 7.1 to 7.7
Note: Figures in Brackets are 't' values of Regression co-efficients.
**Significant at 1% level and * Significant at 5% level

Table 7.20(1): Regression Results with FDI Potential Index as Independent Variable

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Year</th>
<th>Equation</th>
<th>R²</th>
<th>Adj R²</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per capita FDI Approval</td>
<td>1993-94</td>
<td>-30.694 + 338.479FPI**</td>
<td>.593*</td>
<td>.569</td>
<td>24.725</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-1.440) (4.972)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1995-96</td>
<td>-873.288 + 4847.319 FPI **</td>
<td>.573*</td>
<td>.547</td>
<td>22.768</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4.47) (4.772)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2001-02</td>
<td>-219.467 + 1618.166 FPI**</td>
<td>.653*</td>
<td>.633</td>
<td>32.023</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-2.262) (5.659)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FDI Performance Index</td>
<td>1992-93</td>
<td>-0.286 + 4.437 FPI**</td>
<td>.570*</td>
<td>.545</td>
<td>22.578</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.977) (4.752)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1995-96</td>
<td>-0.762 + 5.487 FPI**</td>
<td>.562*</td>
<td>.536</td>
<td>21.828</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-1.914) (4.672)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2001-02</td>
<td>-0.384 + 5.180 FPI**</td>
<td>.681*</td>
<td>.663</td>
<td>36.359</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-1.319) (6.030)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Table 4.2 and 7.9 and 7.11
Note: Figures in Brackets are 't' values of Regression co-efficients.
** and *Significant at 1% level and 5% level.
Alternatively, when FDI potential Index is used as explanatory variable, it turns out significant in all the equations, explaining nearly 56 to 66 percent of variation in FDI flows across states during post liberalization (Table 7.20(1)).

Another interesting observation is that, High FDI attracting states (HFDI) show a stronger co-relation compared with Low FDI performance states (LFDI) with respect to a number of indicators as presented in Table 7.20(2).

Table 7.20(2): Co-relation between Various Factors Determining FDI in High and Low FDI Attracting States (1991 to 2003)

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Indicators</th>
<th>Co-relation with per capita FDI approvals</th>
<th>Co-relation with Inward FDI Performance Index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall 19 States</td>
<td>HFDI</td>
<td>LFDI</td>
</tr>
<tr>
<td>1</td>
<td>Per capita NSDP</td>
<td>.701**</td>
<td>.704*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.308</td>
<td>.642**</td>
</tr>
<tr>
<td>2</td>
<td>Poverty</td>
<td>-.342</td>
<td>-.289</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-.032</td>
<td>-.186</td>
</tr>
<tr>
<td>3</td>
<td>Infrastructure Index</td>
<td>.922**</td>
<td>.956**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.310</td>
<td>.809**</td>
</tr>
<tr>
<td>4</td>
<td>Railways per 1000 sq km</td>
<td>.875**</td>
<td>.959**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.160</td>
<td>.711**</td>
</tr>
<tr>
<td>5</td>
<td>Road/1000 sq km</td>
<td>.965**</td>
<td>.997**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.167</td>
<td>.836**</td>
</tr>
<tr>
<td>6</td>
<td>Per capita consumption of power</td>
<td>.532*</td>
<td>.472</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.484</td>
<td>.522**</td>
</tr>
<tr>
<td>7</td>
<td>Telephone /100 per</td>
<td>.891**</td>
<td>.986**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.232</td>
<td>.782**</td>
</tr>
<tr>
<td>8</td>
<td>Quality of Human Capital. Tertiary Enrolment</td>
<td>.582**</td>
<td>.317</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.235</td>
<td>.650**</td>
</tr>
<tr>
<td>9</td>
<td>Human Development Index*</td>
<td>.446</td>
<td>.606</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.212</td>
<td>.196</td>
</tr>
<tr>
<td>10</td>
<td>Fiscal Deficit as percentage of NSDP</td>
<td>-.452</td>
<td>-.464</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-.125</td>
<td>-.429</td>
</tr>
<tr>
<td>11</td>
<td>R&amp;D Institutions per lakh population</td>
<td>.823**</td>
<td>.879**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.015</td>
<td>.814**</td>
</tr>
<tr>
<td>12</td>
<td>Engineering students per lakh population.</td>
<td>.740**</td>
<td>.548**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.496</td>
<td>.433</td>
</tr>
<tr>
<td>13</td>
<td>Internet Users per lakh population</td>
<td>.990**</td>
<td>.991**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.308</td>
<td>.885**</td>
</tr>
<tr>
<td>14</td>
<td>Industrial Index</td>
<td>.972**</td>
<td>.921**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.676*</td>
<td>.876**</td>
</tr>
<tr>
<td>15</td>
<td>Urbanisation</td>
<td>.892**</td>
<td>.929**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.232</td>
<td>.847**</td>
</tr>
<tr>
<td>16</td>
<td>Number of industries per 100 sq km</td>
<td>.980**</td>
<td>.991**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.586</td>
<td>.845**</td>
</tr>
</tbody>
</table>

Source: Appendix Tables 4.2 and 7.1 to 7.7.

Note: HFDI=High FDI attracting states, LFDI=Low FDI attracting states.

Human Development Index* for 17 states excluding Delhi and Goa.

•♦Significant at 1 percent level; ♦significant at 5 percent level.

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7.6 Determinants of FDI at All India Level:

The objective of this section is to estimate, the main determinants of FDI in India. The decision by foreigners to invest in a given country depends on a wide range of factors in the host country. Among the major ones are: the availability of skilled human capital, adequacy of infrastructure and support facilities, market size, trade policies and other policies that affect macroeconomic stability; economic growth; and political stability. The importance attached to each of these factors depends on the type of investment and the motivations or strategy of investors. Since there is wide gap between approvals and actual FDI inflows in India, this section finds out as to what determines both approvals and actual inflows. A detailed description of some of the factors determining FDI has already been discussed in the third section of this chapter. Only the factors that assume importance at the national level (macro economic) is discussed here. Other than market size, infrastructure, technological advances, the variables selected for FDI determinants at All India level are:

**GDP Growth (GDPGR):** Per capita GDP indicates current market size and GDP Growth indicates potential market size. While a large market size generates scale economies, a growing market improves the prospects of market potential and thereby attracts FDI flows. We use GDP growth measured by the annual growth rate. A positive and high growth rate indicates high and growing productivity of labour and returns on investment.

**Openness (OPEN):** Openness of the economy is defined as the trade (import plus export) share of GDP. FDI is expected to be positively associated with the openness of the host country. Openness explains policy regime as FDI cannot take place unless it is allowed to enter a country. Thus, economy's degree of openness (OPEN) has been included as a proxy to reflect the willingness of a country to accept foreign investment, and proved to be important in attracting capital for India especially during post liberalization (Figure 7.1). It is difficult to statistically examine the impact of FDI-specific policies like incentives offered and removal of restrictions on the operations of foreign firms, since they are hard to isolate from other factors difficult to quantify these policies.
Export Orientation (Total Exports and High Technology products Exports): The more export a country has the more attractive they are for FDI because it indicates a connectedness to the world economy and it provides a motivation for foreign firms to invest in these countries since, above and beyond the home market, they also have a high level of internationalization in the economy, thus providing a better market opportunity. Moreover, a high level of export indicates that firms within this economy have international market knowledge and possess globally competitive products. This is particularly important for knowledge intensive industries in technologically sophisticated countries, where access to knowledge-based agglomeration factors may provide a strong basis for competitive advantage (especially IT and electronics industry in India). Examples of multinational firms investing in India in order to service other markets via export of technology intensive products include Intel, Microsoft, IBM, Honeywell. Thus, we argue that MNCs invest in India in order to take advantage of access to larger adjacent markets and the international experience and globally competitive products of that country.

Macro Economic Stability (Internal)(FISCDEF): Monetary and fiscal policies determine the parameters of economic stability like interest rates and state of budgetary balances and influences all types of investment, domestic and foreign. We expect the sign of fiscal deficit to be negative.

External Stability (REER): We expect high volatility of the exchange rate of the currency in the host country to discourage investment by foreign firms as it increases uncertainty regarding the future economic and business prospects of the host country. The
Real Effective Exchange Rate has been taken into consideration, which is trade based 36 country bilateral weights.

**Granger Causality Test:**

Before going for regression estimation, Causality is investigated using Granger's procedure as mentioned in the Methodology of first chapter. It must be remembered that Granger Causality Test provides a rough guide as to whether the chosen variable leads to FDI or not, but does not explain the magnitude. For the extent of impact, regression analysis has to be resorted. For basic economic factors, there is no need to perform the test. The results of causality test are presented in Table 7.21. Only the variables that show the cause of FDI has been included in the study of determinants of FDI.

**Table 7.21: Granger Causality Test Results for Determinants of FDI in India. (1980-81 to 2002-03)**

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Lags</th>
<th>F-value</th>
<th>Causation</th>
<th>Accept or Reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GDP</td>
<td>0.679</td>
<td>GDP → FDI</td>
<td>GDP impacts GDP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.507</td>
<td>FDI → GDP</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Infrastructure</td>
<td>2.870</td>
<td>ROAD → FDI</td>
<td>Road causes FDI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.099</td>
<td>FDI → ROAD</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>4.500</td>
<td>POWER → FDI</td>
<td>Power causes FDI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.106</td>
<td>FDI → POWER</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1.727</td>
<td>TELE → FDI</td>
<td>TELE causes FDI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.933</td>
<td>FDI → TELE</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Technical</td>
<td>1.719</td>
<td>ENG → FDI</td>
<td>Engineers causes FDI</td>
</tr>
<tr>
<td></td>
<td>manpower</td>
<td>0.556</td>
<td>FDI → ENG</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Development</td>
<td>0.156</td>
<td>DEVEEXP → FDI</td>
<td>DEVEEXP Causes FDI</td>
</tr>
<tr>
<td></td>
<td>Expenditure</td>
<td>0.097</td>
<td>FDI → DEVEEXP</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Openess</td>
<td>4.726</td>
<td>OPEN → FDI</td>
<td>Openess causes FDI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.356</td>
<td>FDI → OPEN</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Exports</td>
<td>0.637</td>
<td>EXP → FDI</td>
<td>EXP causes FDI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.022</td>
<td>FDI → EXP</td>
<td></td>
</tr>
</tbody>
</table>

Source: Appendix Table 7.8

GDP=Gross Domestic Product; ROAD=Road length (sq km); POWER=Per capita Power consumption; TELE=Telephones per lakh population; ENG=Stock of engineers per lakh population; DEVEEXP=Development Expenditure per capita; Exports

Based on Granger Test, and economic literature, the factors contributing to FDI Inflows in India are broadly grouped into three. 1) Basic economic factors, 2) Policy related factor and 3) other aspects of investment climate. Basic economic factors includes, market size and the potential market size (Table 7.22). Openness is the main policy related variable. Other factors include infrastructure availability, technological advances, internal and external stability, good governance, export orientation. The expected signs for all the chosen variables is positive, except for REER and FISCDEF.
Table 7.22 : Factors Determining FDI in India (1980-81 to 2002-03)

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Determinants</th>
<th>Variables used in the study</th>
<th>Expected Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Basic Economic Factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current Market Size and Potential Market</td>
<td>Per Capita GDP (PCGDP)</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>size</td>
<td>GDP Growth Rates (GDPgr)</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>Policy Related Factor</td>
<td>Openness - Total Trade/GDP (OPEN)</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Other Factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Availability of Infrastructure</td>
<td>Road /1000 sq km (ROAD)</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Telephones/lakh population (TELE)</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Power Consumption (per capita) (POWER)</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>Availability of Skilled Labour Force</td>
<td>Tertiary Enrolment/ lakh population (TERT)</td>
<td>+</td>
</tr>
<tr>
<td>5</td>
<td>Technical Advances (5 and 6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Availability of Technical Manpower</td>
<td>Engineers per lakh population (ENG)</td>
<td>+</td>
</tr>
<tr>
<td>7</td>
<td>Research Development</td>
<td>Per capita Research and Development Expenditure (RD)</td>
<td>+</td>
</tr>
<tr>
<td>8</td>
<td>Good Governance</td>
<td>Per capita Development Expenditure (DEVEXP)</td>
<td>+</td>
</tr>
<tr>
<td>9</td>
<td>(Public Investment)</td>
<td>Per capita Fiscal Deficit (FISCDEF)</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Internal Economic and political stability</td>
<td>Per capita Fiscal Deficit (FISCDEF)</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>External Stability</td>
<td>Real Effective Exchange Rates (REER)</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>Exports</td>
<td>Per capita Exports</td>
<td>+</td>
</tr>
<tr>
<td>13</td>
<td>High Technology Exports</td>
<td>Per capita High Technology Intensive products exports (HITEXP)</td>
<td>+</td>
</tr>
</tbody>
</table>

Note: Co-relation matrix is presented in Appendix Table 7.9
Thus the model formulated for this purpose is as follows:

FDI = \sum (Basic Economic Factors + Policy Related Factor + Other Factors)

7.7 Regression Analysis of Determinants of FDI in India:

While studying FDI in Indian context, it is important to distinguish between two main periods; pre-liberalisation and post-liberalisation. The first period was characterized by restricted foreign ownership of firms, foreign exchange controls, restrictions on repatriation of profits and capital, and predominance of state-owned enterprises. The second period is characterised by liberal policies towards FDI. So a dummy variable has been introduced in the model. (0 for Pre-liberalisation and 1 for post liberalisation). After removing the multicorelated variables, the following equations were estimated and the results of the same are presented in Table 7.23.
Table 7.23 presents the multiple regression results of the determinants of FDI in India. Firstly, the basic model is estimated which includes basic economic factors. In the second equation, policy variable (OPEN) is added. Since a great deal of the investments flowing into developing country like India fit into a category Dunning (1993) calls *market seeking*, PCGDP is positive and significant at 1 percent level. In equation 1, Potential market size, (GDP$_{gr}$), which indicates future growth prospects, however turns out negative. OPEN is significant at one percent level in second equation. This indicates that a high degree of openness has increased FDI flows in India. Thus, FDI inflows in India are mainly policy driven. As far as FDI is concerned, Hufbauer et al. (1994) have shown that trade liberalization plays a significant and consistent role in the investment stock locations of the United States and Japan and that the size and openness of the host countries are important determinants of FDI flows. Blomstrom and Kokko (1997) examined the effects of liberalization on FDI. They showed that trade liberalization and a reduction in investment restrictions have different effects on FDI.

However, openness and market size alone are not sufficient to explain the inflows of FDI in India. Along with openness, companion factors that goes to increase the total investment climate of a country needs to be added. These factors include infrastructure, external stability, internal stability, availability of skilled human capital, technical manpower, Research and Development intensity, public investment in developmental activities, and export orientation. To see the role of these factors, a number of regression
equations were estimated. Presence of multi-collinearity among explanatory variables doesn’t permit to use various variables in a single equation. When additional determinants are introduced separately, the results turn out as expected. All infrastructural variables viz, Roads, Telecommunications and Power availability turn out positive and significant at 1 percent level (eq 3, 5 and 6). Quality of human capital, (TERT) is also positive and significant at 1 percent level. (eq. 7). Development public expenditure, Research and Development intensity, availability of technical manpower are all positive and significant at 1 percent level. REER, which indicates external stability and Fiscal Deficit that indicates internal economic and political stability, turns out with a negative sign as expected in models 9 and 4.

Table 7.23: Results of Multiple Regressions of Determinants of FDI Inflows in India
(Dependent Variable Log of Per Capita FDI Inflows)

<table>
<thead>
<tr>
<th>Eq. No.</th>
<th>Equations</th>
<th>R²</th>
<th>Adj R²</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-13.214 +1.887 PCGDP** -0.555 GDPₜ -0.725DU*</td>
<td>.919**</td>
<td>.906</td>
<td>71.569</td>
</tr>
<tr>
<td></td>
<td>(-3.208) (4.861) (-0.976) (1.319)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>-9.753 -0.852 GDPₜ +5.185OPEN** 0.937DU*</td>
<td>.904**</td>
<td>.888</td>
<td>59.390</td>
</tr>
<tr>
<td></td>
<td>(-2.419) (-1.420) (4.118) (1.582)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>-39.978 -0.651 GDPₜ +6.847ROAD** +1.047DU*</td>
<td>.904**</td>
<td>.888</td>
<td>59.351</td>
</tr>
<tr>
<td></td>
<td>(-3.754) (-1.050) (4.116) (1.840)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>-58.401 +9.973ROAD* -0.483FISCDEF +0.811DU*</td>
<td>.896**</td>
<td>.883</td>
<td>56.381</td>
</tr>
<tr>
<td></td>
<td>(-2.048) (1.796) (-0.439) (1.359)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>-14.138 +0.710 GDPₜ +2.092TELE** +1.181DU**</td>
<td>.936**</td>
<td>.928</td>
<td>95.742</td>
</tr>
<tr>
<td></td>
<td>(-4.067) (1.171) (6.071) (3.052)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>-9.590 +1.026 GDPₜ +1.550POWER** 2.534DU**</td>
<td>.873**</td>
<td>.853</td>
<td>43.673</td>
</tr>
<tr>
<td></td>
<td>(-1.730) (1.490) (2.469) (2.892)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>-45.558 0.174 GDPₜ +1.203TERT** +1.203DU*</td>
<td>.918**</td>
<td>.905</td>
<td>70.496</td>
</tr>
<tr>
<td></td>
<td>(-4.235) (0.265) (2.556) (2.556)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>-9.098 -0.574 GDPₜ +1.759DEVEXP** +1.266DU*</td>
<td>.897**</td>
<td>.881</td>
<td>55.056</td>
</tr>
<tr>
<td></td>
<td>(-2.186) (-0.875) (3.820) (2.269)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>-9.395 -1.060REER +6.049OPEN** +0.257DU*</td>
<td>.896**</td>
<td>.880</td>
<td>54.668</td>
</tr>
<tr>
<td></td>
<td>(-1.381) (-0.712) (4.900) (1.275)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>-2.533 -0.405 GDPₜ +1.384ROD** 1.331DU**</td>
<td>.902**</td>
<td>.886</td>
<td>58.276</td>
</tr>
<tr>
<td></td>
<td>(-1.001) (0.618) (4.044) (2.567)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>-36.197 -0.301 GDPₜ +5.255ENG** +1.042DU**</td>
<td>.923**</td>
<td>.911</td>
<td>75.618</td>
</tr>
<tr>
<td></td>
<td>(-4.340) (-0.523) (5.083) (2.196)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>-5.654 -0.607 GDPₜ +1.569EXP** 0.221DU</td>
<td>.927</td>
<td>.915</td>
<td>79.928</td>
</tr>
<tr>
<td></td>
<td>(-2.260) (-1.140) (5.310) (0.372)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>-0.897 -0.832 GDPₜ +1.220HITEXP** 0.251DU*</td>
<td>.921</td>
<td>.909</td>
<td>73.876</td>
</tr>
<tr>
<td></td>
<td>(-0.474) (1.547) (4.989) (1.404)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Appendix table 7.8
Note: Figures in bracket are ‘t’ values of regression co-efficients.
**Significance at 5 percent level and *Significance at 1 percent level.
The relationship between FDI flows and exchange rate was examined by Cushman (1985) who found significant reductions in US direct investment associated with increases in the current real value of foreign exchange, and very strong reductions associated with the expected appreciation of real foreign exchange. Export orientation of economy EXP is significant at one percent level and technological component of exports (HITEXP) is also significant at one percent level (eq. 12 and 13). The Dummy variable is also significant in most of the equations showing that there has been structural change in the factors determining FDI during pre and post liberalization.

The results for individual variables, along with dummy variable is provided in Table 7.24. When taken individually, all factors are significant at 1 percent level. These results suggest that, in addition to traditional determinants of FDI, openness, infrastructure, technological advantages, good governance internal and external stability, availability of skilled and technical manpower are of particular importance for foreign investors to invest in India.

Table 7.24: Regression Results of Three variable Model For Determinants of FDI Inflows In India (1980-81 to 2002-03) (Dependent Variable Log Per Capita FDI Inflows)

<table>
<thead>
<tr>
<th>Eq.No.</th>
<th>Explanatory Variables</th>
<th>Equations</th>
<th>R²</th>
<th>Adj R²</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PCI</td>
<td>-16.106</td>
<td>+0.583*</td>
<td>.915**</td>
<td>.906</td>
</tr>
<tr>
<td></td>
<td>(-5.637)</td>
<td>(5.931)</td>
<td>(1.101)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>GDPGR</td>
<td>5.644</td>
<td>+3.073**</td>
<td>.818**</td>
<td>.799</td>
</tr>
<tr>
<td></td>
<td>(-2.792)</td>
<td>(2.414)</td>
<td>(8.017)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>TELE</td>
<td>-10.515</td>
<td>+1.370**</td>
<td>.933**</td>
<td>.927</td>
</tr>
<tr>
<td></td>
<td>(-6.587)</td>
<td>(7.128)</td>
<td>(3.862)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>ROAD</td>
<td>-46.592</td>
<td>+1.710**</td>
<td>.898**</td>
<td>.888</td>
</tr>
<tr>
<td></td>
<td>(-5.026)</td>
<td>(1.623)</td>
<td>(5.116)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>POWER</td>
<td>-14.972</td>
<td>+1.382*</td>
<td>.859**</td>
<td>.844</td>
</tr>
<tr>
<td></td>
<td>(-3.456)</td>
<td>(3.647)</td>
<td>(2.199)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>TERT</td>
<td>-43.509</td>
<td>+1.251</td>
<td>.917**</td>
<td>.909</td>
</tr>
<tr>
<td></td>
<td>(-5.965)</td>
<td>(6.077)</td>
<td>(2.950)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>ENG</td>
<td>-38.990</td>
<td>+0.970*</td>
<td>.922**</td>
<td>.914</td>
</tr>
<tr>
<td></td>
<td>(-6.201)</td>
<td>(6.332)</td>
<td>(2.176)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>RD</td>
<td>-3.980</td>
<td>+1.237*</td>
<td>.900**</td>
<td>.890</td>
</tr>
<tr>
<td></td>
<td>(-4.234)</td>
<td>(5.207)</td>
<td>(2.535)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>DEVEXP</td>
<td>-11.922</td>
<td>+1.132*</td>
<td>.893**</td>
<td>.882</td>
</tr>
<tr>
<td></td>
<td>(-4.564)</td>
<td>(4.888)</td>
<td>(2.132)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>OPEN</td>
<td>-13.742</td>
<td>+0.768*</td>
<td>.893**</td>
<td>.883</td>
</tr>
<tr>
<td></td>
<td>(-4.635)</td>
<td>(4.918)</td>
<td>(1.292)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>REER</td>
<td>-1.232</td>
<td>+3.533**</td>
<td>.765**</td>
<td>.741</td>
</tr>
<tr>
<td></td>
<td>(-0.127)</td>
<td>(0.211)</td>
<td>(3.673)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>EXP</td>
<td>-8.021</td>
<td>0.04098</td>
<td>.922</td>
<td>.914</td>
</tr>
<tr>
<td></td>
<td>(-5.707)</td>
<td>(6.329)</td>
<td>(0.071)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>EXPHITE</td>
<td>-3.579</td>
<td>1.356**</td>
<td>.04887</td>
<td>.911</td>
</tr>
<tr>
<td></td>
<td>(-4.555)</td>
<td>(5.743)</td>
<td>(0.078)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Appendix table 7.8
Note: Figures in bracket are ‘t’ values of regression co-efficients.
**Significance at 5 percent level and *Significance at 1 percent level.
Determinants of FDI Approvals In India And A Comparative Econometric Analysis of Approvals and Inflows

Since there is wide gap between approvals and actual FDI inflows in India, this section finds out as to what determines both approvals and actual inflows in India. To find out what factors motivate FDI approvals in India, similar multiple regressions are estimated taking Per Capita FDI approvals as dependent variable. Table 7.25 presents the regression results of determinants of approved FDI. A comparison of these results with inflows model (table 7.23) points out the differences.

The results indicate that the size of market is a significant determinant of both FDI approvals and inflows. It is found that growth in the size of the host markets GDPgr is not a significant determinant for FDI inflows but for approvals, it is significant. In equation 1 of Table 7.25, GDPgr is significant at 5 percent level, whereas for inflows model, it is negative. It is the existing size of the market not the potential growth that determines the

Table 7.25: Multiple Regression Results of Determinants of FDI Approvals in India (1980-81 to 2002-03)  
(Dependent Variable Log of Per capita FDI approvals)

<table>
<thead>
<tr>
<th>Eq.No.</th>
<th>Equations</th>
<th>R²</th>
<th>Adj R²</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-20.0.83</td>
<td>+2.095 PCGDP** (4.066) +1.207GDGP gr * (1.824) +1.951DU** (3.069)</td>
<td>.935**</td>
<td>.924</td>
</tr>
<tr>
<td>2</td>
<td>-4.499</td>
<td>+0.157 GDGP gr (0.172) +1.784OPEN (0.931)</td>
<td>3.822DU**</td>
<td>.866**</td>
</tr>
<tr>
<td>3</td>
<td>-49.098</td>
<td>+1.084 GDGP gr * (1.504) +7.496ROAD** (3.877) +2.340DU** (3.537)</td>
<td>.922**</td>
<td>.909</td>
</tr>
<tr>
<td>4</td>
<td>-73.445</td>
<td>+13.21ROAD** (2.046) +1.445FISDEDEF (1.131) +2.33DU** (3.367)</td>
<td>.918**</td>
<td>.905</td>
</tr>
<tr>
<td>5</td>
<td>-12.210</td>
<td>+1.486 GDGP gr (1.435) +1.381TELE** (2.348) +3.108DU** (5.007)</td>
<td>.891</td>
<td>.874</td>
</tr>
<tr>
<td>6</td>
<td>-16.565</td>
<td>+0.711 GDGP gr (0.917) +2.896POWER** (2.937) +2.816DU** (4.034)</td>
<td>.904**</td>
<td>.888</td>
</tr>
<tr>
<td>7</td>
<td>-50.327</td>
<td>+1.799 GDGP gr (2.155) +7.452TERT** (3.771) +2.689DU** (4.489)</td>
<td>.920</td>
<td>.907</td>
</tr>
<tr>
<td>8</td>
<td>-16.618</td>
<td>+1.278 GDGP gr (1.790) +2.084DEVEXP** (4.161)</td>
<td>+2.416DU** (3.982)</td>
<td>.927**</td>
</tr>
<tr>
<td>9</td>
<td>-15.638</td>
<td>+2.46OPEN* (1.570) +4.721REER* (2.489) +1.579DU* (1.324)</td>
<td>.899**</td>
<td>.883</td>
</tr>
<tr>
<td>10</td>
<td>-8.560</td>
<td>+1.431 GDGP_gr* (1.958) +1.570RD** (4.179) +2.552DU** (4.421)</td>
<td>.927**</td>
<td>.915</td>
</tr>
<tr>
<td>11</td>
<td>-43.315</td>
<td>+1.422 GDGP gr* (2.031) +5.598ENG** (4.458)</td>
<td>2.394DU** (4.153)</td>
<td>.932**</td>
</tr>
<tr>
<td>12</td>
<td>-10.633</td>
<td>+1.039 GDGP gr* (1.520) +1.595EXP** (4.209)</td>
<td>+1.658DU* (2.183)</td>
<td>.927**</td>
</tr>
<tr>
<td>13</td>
<td>-5.294</td>
<td>+0.736 GDGP_gr* (1.022) +1.146HITEXP** (3.494)</td>
<td>+1.907DU** (2.286)</td>
<td>.915**</td>
</tr>
</tbody>
</table>

Source: Appendix table 7.8
Note: Figures in bracket are 't' values of regression co-efficients.
**Significance at 5 percent level and *Significance at 1 percent level.
actual inflow of FDI. In most of the approvals model, growth rate of GDP is significant at 5 percent level. This indicates that economic growth and future good prospects of economy act as a rough guide for investors to undertake approvals. Another interesting observation is that openness is not significant for approvals model, whereas, it is significant at 1 percent level in inflows model. When taken individually also, it is not significant (Table 7.26, eq 10) Actual FDI inflows depends on liberalization of FDI policies. All infrastructural facilities are significant for approvals and inflows model but more significant for inflows. This indicates that seeking approvals for undertaking investments i.e., in the first stage of undertaking investments it is the availability of proper Infrastructure facilities (transport that influences cross country location of FDI). However, in the second stage, when actual investments are undertaken what influences more is the actual availability of all infrastructural facilities (telecommunications, transport and power) since all the beta co-efficients of infrastructural variables are more significant than that for approvals.

Table 7.26: Regression Results of Three variable Model For Determinants of FDI Approvals In India (1980-81 to 2002-03) (Dependent Variable Log of Per Capita FDI Approvals)

<table>
<thead>
<tr>
<th>Eq. No.</th>
<th>Explanatory Variables</th>
<th>Equations</th>
<th>R²</th>
<th>Adj R²</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PCI</td>
<td>-13.796</td>
<td>+1.726**</td>
<td>+2.261**</td>
<td>.923**</td>
</tr>
<tr>
<td></td>
<td>(3.944)</td>
<td>(4.066)</td>
<td>(3.489)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>GDPGR</td>
<td>0.850</td>
<td>-0.167</td>
<td>+4.557**</td>
<td>.860**</td>
</tr>
<tr>
<td></td>
<td>(0.372)</td>
<td>(-0.199)</td>
<td>(10.513)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>TELE</td>
<td>-4.629</td>
<td>+0.807*</td>
<td>+3.704**</td>
<td>.880**</td>
</tr>
<tr>
<td></td>
<td>(-1.671)</td>
<td>(1.824)</td>
<td>(6.015)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>ROAD</td>
<td>-38.080</td>
<td>+6.193**</td>
<td>+2.592**</td>
<td>.912**</td>
</tr>
<tr>
<td></td>
<td>(-3.438)</td>
<td>(10.513)</td>
<td>(6.015)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>POWER</td>
<td>-12.836</td>
<td>+2.547**</td>
<td>+2.933**</td>
<td>.899**</td>
</tr>
<tr>
<td></td>
<td>(-2.723)</td>
<td>(2.811)</td>
<td>(4.289)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>TERT</td>
<td>-29.104</td>
<td>+4.792**</td>
<td>+3.186**</td>
<td>.900**</td>
</tr>
<tr>
<td></td>
<td>(-2.817)</td>
<td>(2.856)</td>
<td>(3.303)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>ENG</td>
<td>-30.540</td>
<td>+4.300**</td>
<td>+2.733**</td>
<td>.917**</td>
</tr>
<tr>
<td></td>
<td>(-3.651)</td>
<td>(3.700)</td>
<td>(4.608)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>RD</td>
<td>-3.451</td>
<td>+1.184**</td>
<td>+2.884**</td>
<td>.912**</td>
</tr>
<tr>
<td></td>
<td>(3.037)</td>
<td>(3.464)</td>
<td>(4.891)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>DEVEXP</td>
<td>-10.331</td>
<td>+1.648**</td>
<td>+2.714**</td>
<td>.914**</td>
</tr>
<tr>
<td></td>
<td>(-3.431)</td>
<td>(3.574)</td>
<td>(4.414)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>OPEN</td>
<td>-3.714</td>
<td>+1.659</td>
<td>+3.863**</td>
<td>.866**</td>
</tr>
<tr>
<td></td>
<td>(-0.865)</td>
<td>(0.960)</td>
<td>(4.476)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>REER</td>
<td>18.970</td>
<td>-4.105**</td>
<td>+2.916**</td>
<td>.886**</td>
</tr>
<tr>
<td></td>
<td>(2.180)</td>
<td>(-2.135)</td>
<td>(3.369)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>EXP</td>
<td>-6.568</td>
<td>+1.353**</td>
<td>+1.965**</td>
<td>.919**</td>
</tr>
<tr>
<td></td>
<td>(-3.567)</td>
<td>(3.811)</td>
<td>(2.601)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>EXPHITE</td>
<td>-2.920</td>
<td>+1.026**</td>
<td>+2.086**</td>
<td>.910**</td>
</tr>
<tr>
<td></td>
<td>(-2.863)</td>
<td>(3.347)</td>
<td>(2.555)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Appendix table 7.8

Note: Figures in bracket are 't' values

**Significance at 5 percent level and *Significance at 1 percent level.
Availability of quality human capital (TERT) and public investment in development is more significant for approvals model. A study by Borensztein, et al (1998) suggest that FDI can have a positive impact on growth, particularly when the receiving country has a highly educated workforce, allowing it to exploit FDI spillovers. Availability of technical manpower, export orientation of economy is more significant for FDI inflows. As expected, instability in exchange rates (REER) turns out negative in case of approvals but it is positive but not significant for FDI inflows model.

**Openness and Sectoral Inflows of FDI:**

Another objective of this study is to investigate the impact of openness on the various sectors of FDI (Table 7.21). Specifically, in addition to economy wide trade openness, an analysis of the impact of openness in sectors like infrastructure, Telecommunications, Transport industry, service sector, IT Industry, and total FDI Inflows in manufacturing and in High Technology Intensive Industries is undertaken for post reforms period. Table 7.27 shows that all the sectors have responded well to openness. The model to be estimated here is

\[ Y_t = \alpha + \beta_1 \log(\text{OPEN}) + \mu \]

Where,

\[ Y_t = \text{Log of specific sector} \]
\[ \text{OPEN} = \text{Openess} \]
\[ \mu = \text{Error term} \]

The co-efficient of Openness for sectors like Infrastructure, Information Technology, including Electrical Equipment and electronics, Services Sector is significant at 1 percent level.
### Table 7.27: Regression Results of Openness and Sectoral FDI Inflows During Post Liberalisation

The table presents the regression results for the impact of openness on sectoral FDI inflows during post-liberalisation. The dependent variable is the log of sectoral inflows, and the independent variable is the log of openness. The equations are estimated for various sectors, including Total FDI Inflows, Metallurgical Industry, Infrastructure, Telecommunications, Power, Transport Industry, Information Technology & Electronics, Services Sector, Consultancy Services, Financial & Non-Financial Services, Hotel and Tourism, Trade, Drugs and Pharmaceuticals, Chemicals other than fertilisers, Food Processing Industries, High Technology Intensive Industries, and Manufacturing. The results show the coefficients, standard errors, and significance levels for each equation.

**Source:** Appendix table 4.2 and 7.8

**Note:** Figures in bracket are ‘t’ values. **Significance at 5 percent level and *Significance at 1 percent level.

**Note:** High Technology Intensive Industries includes: Transportation Industry, Industrial Machinery, Machine Tools, Earth-moving Machinery, Miscellaneous Mechanical & Engineering, Industrial Instruments, Scientific Instruments, Chemicals (Other than Fertilizers). Manufacturing consists of other Technology Intensive Industries, Boilers & steam generating plants, Prime movers other than electrical, Agricultural Machinery, Drugs & Pharmaceuticals and other manufacturing.

### 7.8 Determinants of FDI in Manufacturing Sector During Post Liberalisation:

This section goes a step further by conducting econometric analysis of determinants of FDI in the manufacturing sector only instead of total FDI during post reforms. This exercise is basically motivated by two factors. One is, FDI is mainly concentrated in the manufacturing sector, and second it is manufacturing industry that is more conducive to growth. After solving the problem of multicollinearity, the below eight equations were estimated.
selected as the best in terms of both $R^2$ and t values of coefficients, by employing Least Squares method and the results of the same are presented in Table 7.28.

Log (FDIMANU) = $a + b_1 \log (PCI) + b_2 \log (MANU_{GR}) + b_3 \log (OPEN) + b_4 \log (ROAD) + b_5 \log (TELE) + b_6 \log (POWER) + b_7 \log (DEVEXP) + \mu$

Where,

- FDIMANU = Per capita FDI in Manufacturing Sector (Rs.)
- MANU_{GR} = Manufacturing growth rate
- PCI = Trade liberalization
- EXPZON = Export Processing Zones
- INFRA = Infrastructural facilities (Roads per 1000 sq km, Telephones per lakh population, and per capita power consumption)
- ENG = Stock of Engineers per lakh population
- DEVEXP = Per capita Development Expenditure (Rs.)
- RD = Per capita Industrial Research and Development Expenditure (Rs.)
- $\mu$ = Error term

In equation 1 of Table 7.28, market size is significant at one percent level and manufacturing sector growth rate is significant at five percent level. The growth in

Table 7.28: Determinants of FDI in Manufacturing during Post Reforms:
(Independent Variable Log of Per Capita FDI in manufacturing sector)

<table>
<thead>
<tr>
<th>Explainer variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>(PCI)</td>
<td>(-6.161)</td>
<td>(-4.727)</td>
<td>(-4.539)</td>
<td>(-2.501)</td>
<td>(-2.771)</td>
<td>(-3.973)</td>
<td>(-3.973)</td>
<td></td>
</tr>
<tr>
<td>MAUGR</td>
<td>0.0332*</td>
<td>-0.167</td>
<td>0.591</td>
<td>0.337</td>
<td>0.266</td>
<td>0.447</td>
<td>0.338</td>
<td>0.338</td>
</tr>
<tr>
<td>(1.228)</td>
<td>(-4.94)</td>
<td>(1.219)</td>
<td>(0.613)</td>
<td>(0.482)</td>
<td>(0.923)</td>
<td>(0.749)</td>
<td>(0.749)</td>
<td></td>
</tr>
<tr>
<td>OPEN</td>
<td>6.521**</td>
<td>11.586**</td>
<td>1.722**</td>
<td>4.275**</td>
<td>3.118**</td>
<td>3.118**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ROAD)</td>
<td>(7.032)</td>
<td>(4.832)</td>
<td>(3.760)</td>
<td>(2.985)</td>
<td>(4.905)</td>
<td>(4.905)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TELE</td>
<td>POWER</td>
<td>ENG</td>
<td>DEVEXP</td>
<td>RD</td>
<td>$R^2$</td>
<td>Adj $R^2$</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Source: Appendix table 4.2 and 7.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Figures in bracket are 't' values of regression co-efficients.

**Significance at 1 percent level and * significant at 5 percent level.
manufacturing sector also acts as a guide for foreign investors to undertake investment. The coefficient of MANU_{gr} is positive in all the equations but not significant. In equation (1), openness is introduced, which is positively significant at 1 percent level. Openness and market size have no doubt played a major role in increasing FDI in manufacturing sector. The other and most important factor is the availability of infrastructure. All the three infrastructural variables (Roads, telecommunications and power) play an equally important role. The coefficients of all the three indicators of infrastructure are positive and significant at 1 percent level. (Eq. 3, 4 and 5). The significance is high for roads in particular. Further, industrial Research expenditure and Development expenditure, stock of technical manpower are all positive and significant at 1 percent level (equation 6, 7 and 8).

**Determinants of Export-Oriented FDI in India:**

The first step adopted here is to identify the sectors, in which India has revealed comparative advantage in exports. Next step is to identify whether FDI has flown in these sectors. Thus export oriented FDI sectors that have been identified are: Electrical Equipments (Including Software), Industrial Machinery, Machine Tools, Miscellaneous Mechanical & Engineering, Industrial Instruments, Chemicals (Other than Fertilizers), Drugs & Pharmaceuticals, Leather, Leather Goods & Pickers, Transportation Industry, Dye-Stuffs, Textiles (Including Dyed, Printed) Food Processing Industries and Commercial, Office & Household Equipment.

Export-oriented is a special type of FDI and is governed by different factors than is domestic market seeking FDI (Kumar Nagesh, 2002). Many developing countries have established export-processing zones in order to attract FDI. These zones also provide liberal trading environment and provide more efficient infrastructure, port facilities and privileges such as tax holidays. Being efficiency seeking in nature, export-oriented FDI could be more sensitive to availability of quality infrastructure than overall FDI. The regression analysis thus includes other than infrastructure, presence of export processing zones in India, and export orientation of Indian economy as explained earlier. The Granger Causality is in the direction of EXPZONE ‘granger causing’ FDI for India.

\[ F \]

\[ EXPZONE \rightarrow FDI = 5.335 \]

\[ FDI \rightarrow EXPZONE = 0.582 \]

After removing inter-co related variables, 8 models were estimated and the results are presented in Table 7.29.
Log \( (FDI) = a + \beta_1 \log (OPEN) + \beta_2 \log (EXPZONE) + \mu \)  

Log \( (FDI) = a + \beta_1 \log (ROAD) + \beta_2 \log (TELE) + \mu \)  

Log \( (FDI) = a + \beta_1 \log (POWER) + \mu \)  

Log \( (FDI) = a + \beta_1 \log (EXP) + \beta_2 \log (EXPZONE) + \mu \)  

Log \( (FDI) = a + \beta_1 \log (MANUEXP) + \beta_2 \log (HITEXP) + \mu \)  

Log \( (FDI) = a + \beta_1 \log (DEVEXP) + \beta_2 \log (RD) + \mu \)  

Where,

FDI=Per capita Export Oriented FDI inflows (Rs)  
OPEN =Trade liberalization  
EXPZON=Export Processing Zones  
INFRA=Infrastructural facilities (Roads per 1000 sq km, Telephones per lakh population, and per capita power consumption)  
EXP= Per capita Total Exports (Rs)  
MANUEXP=Manufactured Exports (Rs)  
HITEXP=Per capita Exports of High Technology goods(Rs)  
DEVEXP=Per capita Development Expenditure(Rs)  
RD=Per capita Industrial Research and Development Expenditure (Rs)  
\( \mu \) =Error term

### Table 7.29: Determinants of Export-Oriented FDI in India

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPEN</td>
<td>4.900</td>
<td>(-5.496)</td>
<td>5.496</td>
<td>(-5.640)</td>
<td>3.160</td>
<td>(-3.150)</td>
<td>2.512</td>
<td>(-2.512)</td>
<td>2.251</td>
</tr>
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<td>1.711</td>
<td>2.231**</td>
<td>2.476**</td>
<td>2.466**</td>
<td>1.576**</td>
<td>1.613**</td>
<td>1.560**</td>
<td>2.189**</td>
<td>2.251**</td>
</tr>
<tr>
<td>TELE</td>
<td>1.065**</td>
<td>2.781**</td>
<td>(3.718)</td>
<td>2.512</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POWER</td>
<td>1.544**</td>
<td>(6.321)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXP</td>
<td>1.304**</td>
<td>(5.999)</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>MANUEXP</td>
<td>1.278**</td>
<td>(5.987)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HITEXP</td>
<td>1.986**</td>
<td>(4.486)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEVEXP</td>
<td>1.306**</td>
<td>(4.039)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>RD</td>
<td>.894**</td>
<td>.833**</td>
<td>.824**</td>
<td>.738**</td>
<td>.914**</td>
<td>.907**</td>
<td>.907**</td>
<td>.858**</td>
<td>.840**</td>
</tr>
<tr>
<td>Adj R²</td>
<td>.872</td>
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<td>.788</td>
<td>.685</td>
<td>.897</td>
<td>.888</td>
<td>.888</td>
<td>.829</td>
<td>.808</td>
</tr>
</tbody>
</table>

Source: Appendix table 4.2 and 7.8

Note: Figures in bracket are 't' values

**Significance at 1 percent level and * significant at 5 percent level.

Note: There are 7 EPZONE in India. Kandla, Santa Cruz, Cochin, Falta, Madras, Noida and Visakhapatnam
In equation 1, both openness and export-processing zones come up with positive sign and significant at 1 percent level. In model 2, 3 and 4 infrastructural facilities are added individually along with EXPZONE. All of them turn out significant at 1 percent level. EXPZONE is also significant at 1 percent in all the equations. Further as mentioned earlier, the export-orientation of host country is also an important factor determining FDI inflows. So in 5, 6 and 7, total exports, manufactured exports and high technology exports are added respectively, along with EXPZONE. All turn out positive and significant at 1 percent level. DEVEXP, that indicates public investment or good governance in various socio-economic developments is also significant along with EXPZONE. Industrial RD points out the innovativeness of economy to introduce new products and its competitiveness.

7.9 Conclusion

This chapter made a detailed analysis of the factors determining FDI across 19 Indian states and All India level. Across states, it is industrial development of region, availability of infrastructure, availability of skilled human capital, market size, Research and Development institutions, and Information Technology development that determines FDI. At the national level, it is openness, infrastructure, skilled human capital, availability of technical manpower, Research and Development intensity, public investment (good governance), macroeconomic stability and exports, in particular exports of high technology intensive goods. Other than these factors, there are various other factors, which are beyond the scope of this study. Such factors are taxes and incentives offered by governments that can steer GFI in specific industries or regions. These incentives include reduction of corporate income tax, tax holidays, exemptions from import duties and so on. Given the limitations, it is difficult to have a clear pattern of incentives offered by states on different industries. Many states have targeted FDI in industries involving high technology and high value added (software, electronics power). Many studies have found that such incentives play a minor role, given the locational advantages like explored in this chapter. Thus FDI appears to be quite sensitive to host-country characteristics. Since the main determinants have been identified, the further question is to how to improve it and make investment climate attractive and how to improve it. Public investments in socio-economic infrastructure facilitates private investment, which in turn pulls in FDI flows. Huge fiscal imbalances is not conducive to growth. States with weak investment climates tend to become concentrations of poverty. So it is essential strengthen the investment climate (both private and foreign) throughout the country, rather than just in the wealthier states.
References:


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Karnataka HDR (1999), Planning Department, Government of Karnataka.


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Source: CMIE, Infrastructure (Various Issues)
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Source: CMIE, Infrastructure (Various Issues)
## Appendix table 7.3(3) State-wise Bank Branches, Post Offices and Registered Vehicles

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Source: CMIE Infrastructure (Various Issues)
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Source: Statistical Abstract of India (various issues)
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Source: CMIE Infrastructure (Various Issues)
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Source: RBI data on State Finances (2004)
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Source: Annual Survey of Industries, (Various Issues)
### Appendix table 7.7: Variables for Constructing Industrial Development Index

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<th>Urbanisation (percentage)</th>
<th>Nat Value Added (Rs lakhs)</th>
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<th>Output Lakhs</th>
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**Source:** 1) Urbanisation-National Human Development Report 2001, 2, 3, and 4 Annual Survey of Industries (Various Issues)
### Appendix Table 7.8: Variables used for Determinants of FDI

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<th>Year</th>
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<th>Per Capita GDP (Rs.)</th>
<th>Tertiary Enrolment (No)</th>
<th>RD Expenditure(Rs Crores)</th>
<th>Exports (Rs Crores)</th>
<th>High Tech Exports (Rs. crores)</th>
<th>Population (Million)</th>
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**Source:** 1, 2, 8 & 9 Handbook of Statistics on Indian Economy (RBI); 3, 4 and 5-Infrastructure Report of India and CMIE; 7-Statistical Abstract of India; 10-Manpower Planning Profile of India; 11- Department of Science and Technology (DST Reports); 12 and 13- Economic Survey of India

**Note:**
1) Development Expenditure and Gross Fiscal Deficits is centre and states combined.
2) R&D expenditure includes central, state and private sector.
3) High Technology Exports consists of exports of machinery electrical equipment, transport, computer and chemicals.
Appendix Table 7.9: Co-relation Matrix of Variables for Factors Determining FDI in India

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Source: Refer all Appendix tables of this chapter